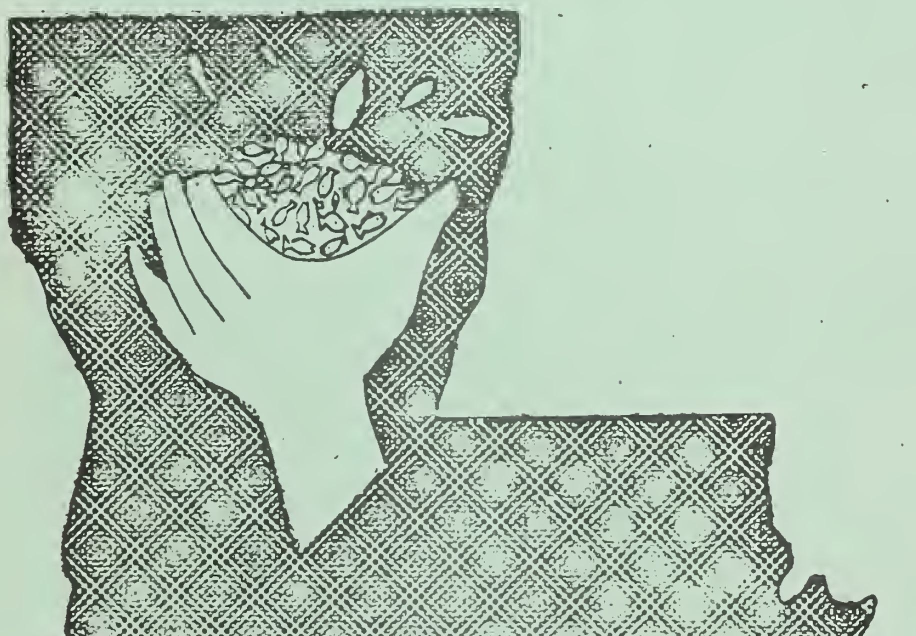
vironmental
impact
statement

LAKE VERRET WATERSHED

ASCENSION, ASSUMPTION, AND IBERVILLE PARISHES
LOUISIANA



U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ALEXANDRIA, LOUISIANA

USDA-SCS-EIS-WS-(ADM)-78-1-(F)-LA

Lake Verret Watershed
Ascension, Assumption, and Iberville Parishes
Louisiana

FINAL REVISED ENVIRONMENTAL IMPACT STATEMENT

Alton Mangum, State Conservationist
Soil Conservation Service

Sponsoring Local Organization

Lower Delta Soil and Water Conservation District
Post Office Box 72
Donaldsonville, Louisiana 70346

Ascension Parish Police Jury
P. O. Box 351
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Assumption Parish Police Jury
Post Office Box 518
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510 Meriam Street
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Louisiana Department of Transportation and Development
Office of Public Works
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April 1978

PREPARED BY
UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
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USDA FINAL REVISED ENVIRONMENTAL IMPACT STATEMENT

Lake Verret Watershed

Ascension, Assumption, and Iberville Parishes

Louisiana

Prepared in Accordance with

Sec. 102(2)(c) of P. L. 91-190

Summary Sheet

I. Final

II. Soil Conservation Service

III. Administrative

IV. Description of Project Purpose and Action: This project is for watershed protection, flood prevention, and drainage in Ascension, Assumption, and Iberville Parishes, Louisiana. It will be implemented under the authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83d Congress, 68 Stat. 666) as amended. Approximately 168 miles of channel work with appurtenant measures, structures for water control and measures to minimize adverse effects to fish and wildlife, will be installed. There will be a loss of about 29 acres of Type 7 Wetland due to project channel rights-of-way. Channel rights-of-way required for construction will occupy about 5 acres. This acreage is along about 1,400 feet and 2,000 feet respectively of Channel M-2 and L-7D1. Channel rights-of-way in the area of adequate channels that require no construction but will need maintenance by the sponsors during the life of the project occupy about 24 acres. This acreage is along about 1,500 feet, 9,500 feet and 9,300 feet respectively of Channel M-1 East, M-2 and M-6. These losses will be mitigated by the development of wetland wildlife habitat area of comparable size. This area will be managed as wetland for wildlife for the life of the project (50 years). Loss of the bottomland hardwoods will be partially mitigated by planting suitable hardwood seedlings on project created spoil in forest land. The channel work will involve clearing and debris removal on 20 miles of existing channels, 6 miles of new channel construction, and 142 miles of enlargement by excavation. This will provide improved water management in a flatland watershed that is 40 percent agricultural cropland and pastureland. Of the 168 miles of channel work proposed, 104 miles will involve channels with only ephemeral flow, 3 miles with intermittent flow, 42 miles with ephemeral ponded water, 7 miles of perennial flow with ponded conditions, and 12 miles of intermittent flow with ponded conditions.

The land treatment program on agricultural land will include bedding, chiseling and subsoiling, conservation cropping system, crop residue management, drainage field ditches, drainage land grading, drainage mains and laterals, land smoothing, pasture and hayland management and planting, structures for water control and wildlife upland and wetland habitat management.

The forest land will continue to receive forest management assistance, forest fire protection and suppression, distribution of planting stock, and forest pest control assistance under the going Cooperative Forestry Program.

V. Favorable Environmental Impacts and Adverse Environmental Effects

Favorable

Economic activity, both agricultural and commercial, in the watershed will increase.

Average annual agricultural damages due to flooding will be reduced 75 percent.

The proportion of costs to value per unit of production will decrease.

The combined programs of land treatment and structural measures will directly benefit 55,300 acres of agricultural land.

Land treatment measures necessary to adequately treat 46,500 acres of agricultural land will be installed. The remaining agricultural land will receive some conservation treatment.

About 8,700 acres of forest land will be retained or managed for wildlife habitat.

About 160 farmers and 480 farm-family members and the employees of those farmers will benefit from increased income.

The average annual gross sales of farm products will increase, resulting in increased average annual net farm incomes.

Installation of structural measures will create 99 man-years of skilled and unskilled jobs available to local labor over a 3-year period. Operation and maintenance will provide 500 man-years of skilled and unskilled jobs available to local labor for the 50-year project life.

Installation of land treatment measures will create about 200 man-years of skilled and unskilled jobs available to local labor over a 10-year period.

All of these 799 man-years of labor are available to both minorities and nonminorities in compliance with all requirements respecting nondiscrimination as contained in the Civil Rights Act of 1964, and the Regulations of the Secretary of Agriculture (7 C.F.R. Sec. 15.1-15.12).

Minority farm-owner families, consisting of less than one percent of the farm families in the watershed, will increase their incomes.

An estimated 17 minority farm operators, who are cooperators with the conservation district program, will benefit to the same degree as the other cooperators within the benefited agricultural areas. Some minority farm operators who are not cooperators with the district will benefit, but limited to the degree that needed land treatment measures are applied.

An estimated 63 minority families within the urban flood plain will benefit.

The project will indirectly afford employment opportunities for workers in minority groups.

Increased sugarcane yields will increase domestic supply of sugar, thereby improving the United States balance of trade.

Fuel consumption per unit of production will decrease.

Increased crop yields will provide more efficient use of prime agricultural land and increase production of protein-rich, high-energy foodstuffs to help the world's nutritional problems.

The land use change from forest to open land would create an additional 1,200 acres of open land habitat.

The project will reduce urban flood damages in the western urban area of Donaldsonville. It will eliminate flooding from the first floors of 38 houses.

The value of 450 acres of land in the western urban area of Donaldsonville will increase.

Yard damages and nuisance flooding will be eliminated or reduced within the 450-acre urban area.

Temporary increases in open land habitat along channels will result for bobwhite and mourning doves.

Land treatment practices that reduce sediment will also reduce agrichemicals that may be attached to the sediment.

Land treatment practices for wildlife will retain or improve habitat.

Erosion will be reduced 138,000 tons per year or 9 percent. Sediment removal will be reduced 81,000 tons per year in the split ditch system.

Sediment delivered to Lake Verret will be reduced 1.7 acre-feet per year.

Adverse

Erosion as a by-product of construction will total 21,000 tons during the project construction period of 3 years, or 7,000 tons per year.

Sediment derived from construction that will be delivered to the watershed boundary will average approximately 3,500 tons per year for 3 years.

Water temperatures in ponded water channels will increase slightly.

There will be a slight reduction in air quality in the immediate vicinity of construction due to exhaust and dust from about 3 units of diesel-powered equipment, 2 service vehicles, and disposal of residues.

There will be a temporary increase in noise level due to construction equipment.

Project measures will require an additional 185 acres of forest land for channel rights-of-way. The concurrent loss of income from timber products is valued at $12 per acre per year.

An estimated 1,200 acres of forest land will be cleared as a result of project induced clearing, with the loss of an average annual income of $12 per acre per year for timber products and $2 per acre per year from leased hunting rights.

Vegetation on about 348 (249 existing and 99 additional) acres of Type 1 Wetland[1/] will be cleared for channel right-of-way purposes, and a corresponding loss of food and cover for animals utilizing these wetlands.

Frequency and peak stages of flooding as the result of overbank flows on an additional acreage of Type 1 Wetlands[1/] will be

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[1/] All references, here and throughout the Environmental Impact Statement, to wetlands are in accord with the definition contained in Circular No. 39, U.S. Department of the Interior.

affected. The effect of direct precipitation and wetness as a result of restricted localized drainage will not be changed.

Vegetation comprised primarily of baldcypress and tupelo gum will be cleared for channel right-of-way for construction or maintenance on about 29 (15 existing and 14 additional) acres of Type 7 Wetlands.

The filtering function of about 100,000 acres of Type 1 and 7 Wetlands will be somewhat reduced by the loss of about 377 (192 existing and 185 additional) acres for project channels rights-of-way.

About 321 (192 existing and 129 additional) acres of other bottomland hardwoods will be cleared for channel rights-of-way, which will result in a loss of habitat for game and nongame animals.

Two hundred fifteen miles of project channel work and maintenance will result in cover losses, disruption of the benthic community, local increases in turbidity and suspended solids during construction, and an overall lowering of the biological productivity.

Some increases in ammonia nitrogen, nitrate nitrogen, and orthophosphate will occur in the Lake Verret system with associated impacts on fish and wildlife populations.

Land use changes, more intensified agriculture, reduction of out-of-bank flooding, and more rapid removal of surface runoff will result in increases in the amount of some agricultural chemicals entering some waterways with subsequent impacts on fish and wildlife populations.

VI. List of Alternatives Considered

A. Land Treatment Only

B. Systems of Levees, Pumps, Channel Work, and Land Treatment:

   1. Around individual farms or evaluation units

   2. On the boundary between the swamp and the agricultural land

   3. Around the northern and eastern banks of Lake Verret

C. Change Land Use to Enterprises That Will Tolerate Wet Soil Conditions

D. Land Treatment, Channel Work, and Alternate Outlet

E. Channel Work and Restrictive Easements on 21,400 Acres of Bottomland Hardwoods.

D. No Project

VII. Comments were requested on the Draft Revised Environmental Impact Statement from the following agencies, organizations, and individuals:

Chief of Engineers, Department of the Army
Secretary of the Interior*
Office of Environmental Project Review, Department of the Interior
Deputy Assistant Secretary for Environmental Affairs, Department of Commerce
Office of Environmental Affairs, Department of Health, Education and Welfare
Commandant, U.S. Coast Guard, Department of Transportation
Director, Office of Equal Opportunity
Regional Administrator, Environmental Protection Agency*
Administrator, Environmental Protection Agency
Federal Power Commission
Bureau of Laboratories, Vector-Borne Diseases Division, Department of Health, Education, and Welfare
Louisiana Commission on Intergovernmental Relations*
Executive Director, Louisiana State Soil and Water Conservation Committee
Natural Resources Defense Council
Friends of the Earth
Environmental Defense Fund*
National Wildlife Federation
National Audubon Society
Environmental Impact Assessment Project
Division of Public Health Engineer, Office of Public Works
District Engineer, U.S. Army Corps of Engineers*
National Park Service, Southwest Regional Office, Department of the Interior
Agricultural Stabilization and Conservation Service
State of Louisiana Office of Science Technology and Environmental Policy*
Bureau of Outdoor Recreation
Southcentral Representative, Wildlife Management Institute*
Department of Conservation
Louisiana Geological Survey
Joint Legislative Committee on Environmental Quality
Bureau of Environmental Health, Water, and Air Quality
Office of State Planning
Water Resource Division, U.S. Geological Survey
The Izaak Walton League of America

Chairman, Louisiana State Soil and Water Conservation Committee
Chancellor of Center for Agricultural Science and Rural Development
State Agricultural Stabilization and Conservation Service Committee
Clifford M. Danby, New Orleans, Louisiana
John Pucheu, Daily World, Opelousas, Louisiana
Research Director, Coastal Resources Law
Public Hearings and Environmental Impact Engineer, Louisiana Department of Transportation and Development, Office of Highways
National Marine Fisheries Service, U.S. Department of Commerce*
Louisiana Farm Bureau
Ms. Doris Falkenheiner
Sierra Club, Delta Chapter
Commissioner, Louisiana Department of Agriculture*
Michael Osborne, Sierra Club, Delta Chapter*
Environmental Protection Agency, Region IV*
Louisiana Forestry Association
Regional Environmental Control Director, ECA
U.S. Department of Transportation
League of Women Voters
Baton Rouge Chapter, National Audubon Society
State of Louisiana, Department of Culture, Recreation and Tourism
Louisiana Stream Control Commission
Curator of Anthropology, Department of Geography and Anthropology, Louisiana State University
Louisiana Forestry Commission
Louisiana Cooperative Extension Service
Louisiana Wildlife Federation
Louisiana Environmental Professionals Association
Orleans Audubon Society
Delta Chapter, New Orleans Group, Sierra Club
Louisiana Department of Wildlife and Fisheries*
Louisiana Department of Transportation and Development, Office of Public Works*
Technical Service Center, Soil Conservation Service
Farmers Home Administration
Southeastern Area, State and Private Forestry, U.S. Forest Service
Carl Hoover, U.S. Forest Service
Area Manager, U.S. Fish and Wildlife Service
U.S. Fish and Wildlife, University of Southwestern Louisiana
Supervisor, Kisatchie National Forest
Lower Delta Soil and Water Conservation District
Ascension Parish Police Jury
Assumption Parish Police Jury
Iberville Parish Police Jury
Senator Russell B. Long
Senator J. Bennett Johnston
Representative Gillis W. Long
Representative Henson Moore
* Denotes those who responded.

VIII. Draft statement transmitted to CEQ on August 31, 1977.

USDA SOIL CONSERVATION SERVICE

FINAL REVISED ENVIRONMENTAL IMPACT STATEMENT[1/]

for

Lake Verret Watershed, Louisiana

Ascension, Assumption, and Iberville Parishes, Louisiana

Installation of this project constitutes an administrative action. Federal assistance will be provided under authority of Public Law 83-566, 83d Congress, 68 Stat. 666, as amended.

SPONSORING LOCAL ORGANIZATIONS

Ascension Parish Police Jury
Assumption Parish Police Jury
Iberville Parish Police Jury
Lower Delta Soil and Water Conservation District
Louisiana Department of Transportation and Development - Office of Public Works

PROJECT PURPOSES AND GOALS

The purposes of the project are watershed protection, flood prevention, and drainage. The project goals are to:

1. Provide agricultural land a substantial increase in level of protection from flooding and wetness problems and to provide for increased economic returns.

2. Provide improved farming conditions to promote increases in farm family net returns and improved living conditions.

3. Reduce average soil loss to the minimum consistent with sound conservation farming methods.

4. Provide flood protection to part of the City of Donaldsonville and the adjacent urban area to improve quality of life.

[1/] All information and data, except as otherwise noted by reference to source, were collected or compiled by the Soil Conservation Service and the Forest Service, U.S. Department of Agriculture.

5. Protect and maintain an adequate channel system, that otherwise could become impaired.

6. Minimize damage to fish and wildlife resources which will occur from the installation of structural measures by channel construction and spoil placement.

7. Treat and improve the forest land in such a manner that it will retain wildlife habitat and recreation opportunities.

8. Make way for achieving the preceding objectives by providing acceleration of the going land treatment program so that about 70 percent of the agricultural land will be adequately treated during the project installation period.

PLANNED PROJECT

Foreword

The Lake Verret Watershed Work Plan was approved for operations by Congress on February 20, 1973. As required by Section 102(2)(C) of the National Environmental Policy Act of 1969 (Public Law 91-190), an environmental impact statement was submitted to the Council on Environmental Quality. Because of the concern for environmental values by the Service, other Federal, State, local agencies, and other interests in the project, the Sponsoring Local Organizations requested the watershed work plan be supplemented to eliminate and minimize damages to important environmental factors and to prepare a revised environmental impact statement in accordance with new guidelines before commencing installation of structural measures.

The Service, the Sponsors, the U.S. Fish and Wildlife Service, the Louisiana Department of Fisheries and Wildlife, the U.S. Forest Service, and the Louisiana Office of Public Works, and other interested publics have reviewed the watershed work plan to determine changes needed to provide a plan that is more compatible with the present land use and one that would minimize adverse effects on the environment. Flood protection for the western urban area of Donaldsonville, Louisiana was included as a project objective by the Sponsors. The Sponsors also requested that one new channel located in openland be included as a project channel. Since this watershed was planned, the policy of the Service has changed, particularly in relation to wetlands. Previously, Types 3, 4, and 5 were the wetlands that could not be converted to another land use as a purpose of a P.L. 566 project. New policy provides that the Service is not to provide technical and financial assistance for draining or otherwise altering Wetland Types 3 through 20 in order to convert them to other land uses. As the result of a statewide study conducted by the Service and new studies for preparation of the work plan supplement, the lowest elevations at which land can be adequately drained by gravity for crop production in the Lake Verret Watershed has been revised. This has resulted in the raising of design water surface elevations on the downstream end of most channels that outlet through forest land. As a result of these changes, about 52 miles of previously planned project channels in Types 1 and 7 Wetlands have been eliminated. Work on an additional 20 miles of channel segments in Types 1 and 7 Wetlands were eliminated also, but the present flow conditions will need to be maintained. Adequate drainage and flood protection for existing cropland and pastureland will be provided in keeping with project objectives.

The original land treatment program provided for 91,900 acres to receive adequate treatment over a ten-year period.[1/] Because of

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[1/] Land Adequately Treated - Land used within its capability on which the conservation practices that are essential to its protection and planned improvement have been applied. This item applies to land on which the Soil Conservation Service has provided technical assistance.

shifts in land use, this acreage was revised to 84,800 acres and the installation period extended for an additional four years. Since 1973, when the watershed was approved for operations, 29,600 acres have received adequate treatment, leaving 55,200 acres to be treated during the remainder of the installation period. This Environmental Impact Statement is based on the land treatment program remaining to be installed.

Soil surveys are an integral part of land use planning. Therefore, a detailed soil survey has been made of the entire watershed.

Land Treatment

Land treatment is an essential element in watershed protection. The program was developed considering the resource base, the standard of living, and the environment. The measures will be installed by the landusers, with technical assistance from the Soil Conservation Service through the Lower Delta Soil and Water Conservation District, the U.S. Forest Service, and the Louisiana Forestry Commission. These measures were planned following intensive on-the-land investigations and inventories with the landusers. Decisions made by landusers based on alternatives for meeting the above soil and water conservation objectives are recorded in soil and water conservation plans.

During the remaining installation period for land treatment, six landusers will become cooperators, 54 soil and water conservation plans will be prepared, and 82 conservation plans will be revised.

The land treatment program consists of installing practices necessary to adequately treat 55,200 acres during the remaining installation period. Included are 46,500 acres of cropland and 8,700 acres of forest land that will be managed or retained for wildlife habitat. The measures necessary to adequately treat the pastureland have been installed.

The following is a list of planned conservation land treatment measures and a brief description of each:

Bedding - The plowing, blading, or otherwise elevating the surface of flatlands to form a series of broad, low ridges separated by shallow parallel furrows that provide surface drainage.

Chiseling and Subsoiling - Loosening the soil without inverting and with a minimum of mixing of the surface soil, to shatter restrictive layers below normal plow depth that inhibit water movement and root penetration.

Conservation Cropping System - Using cropping sequences that maintain the soil resource with adequate organic matter.

Crop Residue Management - Using plant residues to protect cultivated fields during critical erosion periods. (See picture, page 13).

Sugarcane Residue Left In Field

Pasture That Is Receiving Proper Management

Drainage Field Ditches - Open drainage ditches that are constructed for collecting and removing excess water within a field.

Drainage Land Grading - Reshaping or forming the surface of land to be drained by grading to planned slopes.

Drainage Main and Lateral - Open drainage ditches that are constructed to a designed size and grade to remove excess surface water that would hamper plant growth.

Land Smoothing - Removing slight irregularities on the land surface to: (1) provide a more uniform surface; (2) provide for a more uniform application of irrigation water; (3) improve surface drainage; (4) obtain more uniformity in planting and cultivation; and (5) improve equipment efficiency.

Structures for Water Control (pipe drops) - Using structures in drainage systems to control the direction or rate of flow or for the protection and management of soils and plants.

Wildlife Wetland Habitat Management - Retaining, creating, or managing wetland habitat for wildlife to provide food and cover.

Wildlife Upland Habitat Management - Retaining, creating, or managing habitat, other than wetland, for wildlife to provide food and cover.

The above practices will be installed on cropland and forest land as applicable.

Conservation measures that must be installed (based on the soils and on-site investigations) to assure that 46,500 acres of cropland will be adequately treated are conservation cropping systems, crop residue management, chiseling and subsoiling, and complete onfarm drainage systems, as needed. Practices that are included in the drainage system are drainage mains and laterals, drainage field ditches, bedding, drainage land grading, land smoothing, and structures for water control (pipe drops). The remaining 18,565 acres[2/] of cropland will receive some conservation treatment.

As a part of their conservation plan, individual landusers will retain or manage approximately 8,700 acres of forest land for upland and wetland wildlife habitat.[3/] Technical assistance through the soil and

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[2/] 20,100 acres have received adequate treatment; 14,400 during the installation period and 5,700 prior to the watershed having been approved for operations.

[3/] 20,700 acres were planned to be retained during the installation period. Approximately 12,000 acres of this have been planned since the watershed became operational and are being retained. The 8,700 acres will be done during the remaining installation period.

water conservation district program will be made available to landusers to encourage and assist them in retaining these valuable wildlife lands.

The remaining forest land acreage will continue to receive forest management assistance, forest fire protection and suppression, distribution of planting stock, and forest pest control assistance under the going Cooperative Forestry Programs.

The forestry program will be carried out by the Louisiana Forestry Commission in cooperation with the U.S. Forest Service through the various Federal-State cooperative forestry programs.

Forest land treatment measures will be installed according to soil and water conservation plans based on decisions by the landuser, recommendations by resource planners, and the capabilities and limitation of the soil.

Even though the land treatment measures are installed voluntarily by the individual landusers, experience in other P.L. 566 projects in Louisiana indicate that these measures do materialize. For instance, of the 38 watersheds in Louisiana that have been approved for operations in the last 18 years, 12 have completely installed the planned land treatment program. More than 75 percent of the planned land treatment program has been installed on another six. The remaining 20 have either been approved for operations recently or installation of structural measures has been delayed pending the preparation of Environmental Impact Statements.

Structural Measures

The planned structural measures for agricultural acreages are designed to accommodate flow from the 2-year frequency storm. Flood protection and drainage will provide the primary benefits. Full consideration will be given to minimizing adverse effects on the environment to include fish and wildlife resources.

The planned channel work in the western urban area of Donaldsonville are designed to provide a 100-year level of flood protection from significant damage to residences and businesses. In addition, the reduction of floodwater will decrease yard damage and nuisance flooding.

Structural measures consist of channel work and related measures such as structures for water control and vegetation of disturbed areas.

Channel work includes excavation of new channels, enlarging existing channels and clearing them of brush and debris. The length and area occupied by channels before and after construction are shown by type of work (excavation and clearing) in the tabulation on pages 16 and 17.

Approximately 215 miles of channels, which are referred to herein as "project channels", must be worked or maintained at their present

Length and Area Occupied by Project Channels Rights-of-Way

	Excavation			Clear Only			Adequate		
	Length	Right-of-Way		Length	Right-of-Way		Length	Right-of-Way	
Channel Number	Miles	Existing Acres	Planned Acres	Miles	Existing Acres	Planned Acres	Miles	Existing Acres	Planned Acres
M-1	-	-	-	-	-	-	.55	7.73	7.73
M-1 East	-	-	-	-	-	-	.66	9.16	9.16
L-1A	0.92	2.19	5.48	-	-	-	-	-	-
L-1B	3.24	11.16	24.79	-	-	-	-	-	-
L-1B1	1.27	6.41	8.39	-	-	-	-	-	-
L-1B2	0.65	1.48	3.23	-	-	-	-	-	-
M-2	0.76	7.27	8.83	-	-	-	2.27	22.246	25.62
M-3	.55	1.00	4.65	-	-	-	-	-	-
L-3A	.92	0	9.20	-	-	-	-	-	-
L-3B	1.17	0	6.83	-	-	-	-	-	-
M-4	.91	3.31	8.26	-	-	-	.58	2.10	5.60
L-4Aa/	2.35	18.51	25.05	-	-	-	-	-	-
M-5	6.13	40.17	62.30	-	-	-	-	-	-
L-5Ca/	1.23	2.53	14.65	-	-	-	-	-	-
M-6	-	-	-	-	-	-	5.62	56.76	90.85
L-6A	7.28	101.65	121.34	-	-	-	5.21	41.89	68.29
L-6A1	3.21	14.92	29.21	2.67	7.12	20.71	-	-	-
L-6A1Ba/	2.84	8.61	24.11	-	-	-	-	-	-
L-6A2a/	4.73	39.14	50.96	-	-	-	-	-	-
L-6A2Aa/	0.76	1.84	5.52	-	-	-	-	-	-
L-6A2Ba/	1.04	3.16	8.85	-	-	-	-	-	-
L-6A3	6.82	37.07	96.46	0.95	4.22	10.73	-	-	-
L-6A3A	1.04	1.89	5.18	-	-	-	-	-	-
L-6A3D	-	-	-	0.12	0.30	0.90	-	-	-
L-6A3E	0.10	0.32	0.75	-	-	-	-	-	-
L-6A3F	0.06	0.08	0.39	-	-	-	-	-	-
L-6A4a/	2.56	14.46	25.94	-	-	-	-	-	-
L-6A5	.53	1.28	3.84	0.32	0.78	2.34	2.39	4.33	15.89
L-6A5A	-	-	-	1.23	4.48	11.94	0.28	1.03	2.75
L-6A6	-	-	-	2.04	6.38	17.71	-	-	-
L-6A6Aa/	3.60	28.84	35.87	-	-	-	-	-	-
L-6A6Ca/	2.56	14.29	19.28	-	-	-	-	-	-
L-6A6Da/	2.18	6.60	18.48	-	-	-	-	-	-
L-6A7	-	-	-	0.83	3.01	8.03	2.45	7.42	20.78
L-6A7A	1.57	5.31	10.25	-	-	-	0.14	0.66	0.99
L-6A7Ba/	.66	4.02	5.63	-	-	-	-	-	-
L-6A9a/	0.47	1.15	3.45	-	-	-	-	-	-
L-6B	3.97	13.21	32.31	-	-	-	-	-	-
L-6B1a/	0.57	3.44	4.82	-	-	-	-	-	-
L-6C	6.48	45.44	60.66	-	-	-	-	-	-
L-6C1a/	3.22	25.82	30.52	-	-	-	-	-	-
L-6C2a/	0.95	2.30	6.90	-	-	-	-	-	-
L-6D	5.01	37.81	43.70	-	-	-	-	-	-
L-7A	-	-	-	-	-	-	0.44	7.77	7.77
L-7A1	1.02	8.80	10.98	-	-	-	-	-	-
L-7A1Ba/	0.76	3.68	5.52	-	-	-	-	-	-
L-7A1Ca/	.57	3.44	4.82	-	-	-	-	-	-
L-7A1Da/	0.85	4.13	6.21	-	-	-	-	-	-
L-7A2	-	-	-	1.42	14.74	14.84	1.36	10.43	17.95
L-7A2A	-	-	-	-	-	-	3.06	29.89	29.89
L-7A2A2	0.58	3.90	4.82	-	-	-	-	-	-
L-7A2Ba/	2.80	12.99	22.90	-	-	-	-	-	-
L-7A2Ca/	0.95	4.60	6.90	-	-	-	-	-	-
L-7A2Da/	0.57	2.76	4.14	-	-	-	-	-	-
L-7A2Ea/	0.57	2.76	4.14	-	-	-	-	-	-

Length and Area Occupied by Project Channels Rights-of-Way

	Excavation			Clear Only			Adequate		
	Length	Right-of-Way		Length	Right-of-Way		Length	Right-of-Way	
Channel Number	Miles	Existing Acres	Planned Acres	Miles	Existing Acres	Planned Acres	Miles	Existing Acres	Planned Acres
L-7A3	-	-	-	-	-	-	0.13	0.44	1.06
L-7A3A	0.33	0.79	2.37	0.41	1.00	3.00	0.28	0.69	2.07
L-7B South	1.57	20.96	25.72	0.32	6.05	5.86	-	-	-
L-7B North	0.95	9.76	10.91	0.95	12.63	12.63	1.14	15.15	15.14
L-7B1	-	-	-	1.34	17.11	17.92	0.46	5.55	5.55
L-7B1Aa/	0.66	3.21	4.83	-	-	-	-	-	-
L-7B1Ba/	1.33	8.04	11.25	-	-	-	-	-	-
L-7B2	-	-	-	-	-	-	0.39	1.41	3.76
L-7B2A	0.74	1.65	4.34	-	-	-	-	-	-
L-7B3	-	-	-	-	-	-	0.44	1.07	3.21
L-7B3Aa/	1.33	8.04	11.25	-	-	-	-	-	-
L-7B4	0.91	7.70	7.70	0.57	1.79	4.97	-	-	-
L-7B4A	-	-	-	0.19	0.34	1.13	0.17	0.37	1.19
L-7C	1.33	14.46	13.66	-	-	-	-	-	-
L-7C1	1.80	21.44	21.88	0.87	5.12	7.49	3.39	19.93	31.87
L-7C1A	0.83	4.53	6.56	0.30	1.65	2.38	-	-	-
L-7C1Ba/	0.95	4.02	8.04	-	-	-	-	-	-
L-7D	10.86	88.57	95.51	0.80	11.17	11.17	7.52	96.27	96.27
L-7D1	3.99	37.90	42.74	1.79	26.11	28.28	-	-	-
L-7D1Aa/	1.14	7.12	10.56	-	-	-	-	-	-
L-7D1Ba/	1.32	7.69	12.16	-	-	-	-	-	-
L-7D1C	0.74	5.83	6.72	-	-	-	3.69	35.80	40.29
L-7D1C1a/	1.23	9.70	11.94	-	-	-	-	-	-
L-7D1Ea/	1.39	8.71	12.42	-	-	-	-	-	-
L-7D1Ga/	1.08	3.65	8.20	-	-	-	-	-	-
L-7D1Ha/	0.95	5.06	8.28	-	-	-	-	-	-
L-7D3	-	-	-	-	-	-	0.78	8.46	8.46
L-7D3A	1.92	3.49	12.79	-	-	-	1.78	13.14	17.74
L-7D3A1a/	1.76	7.47	19.21	-	-	-	-	-	-
L-7D4a/	1.27	4.61	12.30	-	-	-	-	-	-
L-7D6a/	2.65	12.87	26.53	-	-	-	-	-	-
L-7D7	-	-	-	1.92	6.51	17.67	-	-	-
L-7D8a/	2.46	12.39	21.11	-	-	-	-	-	-
L-7D10a/	1.93	12.05	16.72	-	-	-	-	-	-
L-7D10Aa/	1.17	5.61	9.47	-	-	-	-	-	-
L-7D10A1a/	0.51	1.24	3.72	-	-	-	-	-	-
L-7D13a/	1.38	7.66	13.18	-	-	-	-	-	-
L-7D14	-	-	-	-	-	-	0.12	0.35	0.98
L-7D14Aa/	1.25	3.79	10.61	-	-	-	-	-	-
M-8	-	-	-	-	-	-	0.82	4.49	9.48
L-8A	0.61	1.49	4.47	-	-	-	0.75	2.27	6.35
L-8B	-	-	-	1.17	3.55	9.94	0.34	1.02	2.85
M-9	-	-	-	-	-	-	0.23	1.52	2.90
L-9Aa/	0.38	1.15	3.22	-	-	-	-	-	-
M-20	2.44	14.17	30.39	-	-	-	-	-	-
M-20A	1.29	4.68	10.14	-	-	-	-	-	-
L-20A1	0.41	0	3.12	-	-	-	-	-	-
Total	147.84	925.24	1,430.53	20.21	134.06	209.64	47.44	409.56	552.44

a/ Estimated (channel not surveyed)

capacities in order to achieve a level of flood protection and drainage that will meet project objectives. As shown on the Project Map, appendix C, 168 miles require work. This includes 20 miles to be cleared, 148 miles to be enlarged by excavation. Forty-seven miles will require only maintenance. The proposed channel maintenance measures are described on page 23. The existing types and flow characteristics of project channels are shown in the tabulation below.

Ground cover and root armor will usually be left intact in channels where excavation is not required. Because of normally high ponded water levels in some channels that are to be cleared only, trees and debris will necessarily be removed by machinery. This action will disturb a narrow strip of channel bank on one or both sides.

The project channels were designed in accordance with SCS Technical Paper 25, which specifies limits for waterflow velocities in keeping with the type of soil to be exposed within the channels. Tests showed the soils are predominately clays with various plasticity indexes (CH and CL). Design velocities for various channel reaches are shown in table 3 of the supplement to the watershed work plan.

Type of Channel	Length Project Channels	Length Requiring Work
	------------miles	-------------
Manmade or previously modified[a/]	209	162
Nonexisting or no-defined channel	6	6
Total	215	168
Flow Characteristics[a/]		
Ephemeral	117	104
Intermittent	3	3
Perennial-Ponded Water	21	7
Intermittent-Ponded Water	14	12
Ephemeral-Ponded Water	60	42
Total	215	168

[a/] Refer to the appendix L-11 for Coding System for Inventory of Channel Work.

The increase in right-of-way area required for construction is summarized in the following tabulation.

Land Use	Existing Channel R.O.W. (acres)	With Project Channel R.O.W. (acres)	Change Due To Project (acres)
Open Land			
Channel	335	366	31
Berm	48	264	216
Spoil	83	314	231
Subtotal	466	944	478
Wooded Channel Banks			
Channel	78	80	2
Berm	21	48	27
Spoil	41	69	28
Subtotal	140	197	57
Forest Land			
Channel	145	145	0
Berm	36	75	39
Spoil	94	127	33
Subtotal	275	347	72
Forest Land-Type 1 Wetland			
Channel	291	300	9
Berm	72	134	62
Spoil	177	205	28
Subtotal	540	639	99
Forest Land-Type 7 Wetland			
Channel	33	33	0
Berm	4	11	7
Spoil	11	18	7
Subtotal	48	62	14
TOTAL	1,469	2,189	720

Several alternatives for establishing vegetative cover on areas to be disturbed were evaluated on similar projects by the Louisiana Department of Wildlife and Fisheries, the U.S. Fish and Wildlife Service, and the Soil Conservation Service. Due consideration was given to providing the most expedient method of re-establishing vegetation to prevent erosion and to provide food and cover for wildlife. Ground cover will be established and hardwood seedlings planted where ap-

plicable to aid in the prevention of erosion and to provide food and cover for wildlife.

Seasonally high flood stages in the vicinity of Lake Verret and Lake Long control the outlet conditions for channels in these areas. The elevation of the 2-year maximum flood stage was used as a basis for channel design. Land lower than this elevation cannot be provided with an adequate measure of protection.

Project channel work extending into the low-lying areas downstream was planned to provide adequate protection for open land in the benefited agricultural area. It will not provide adequate agricultural flood protection to areas now in forest land downstream from the benefited areas. The planned project channels will not provide drainage for any Type 7 Wetlands.

Approximately 210 acres of Type 7 Wetland exist along each side of Channel L-7D-1, for a distance of about 2,000 feet between Channel L-7D-1E and State Highway 75. This channel ponds water at or very near normal ground elevation throughout the year. There are a number of openings (gaps) in the existing spoil on each side of the channel that were created by previous construction. These openings are at or above normal ground elevation except for a small recently constructed ditch that enters from the east. A structure for water control will be installed in this ditch opening, the permanent crest elevation of which will be such that the water elevation in these wetlands will be maintained above normal ground. This structure can be operated to maintain water level above the crest, but it cannot be lowered below the crest. Other spoil openings will remain in the existing condition.

The construction of Channel M-2 will end after extending into Type 7 Wetlands approximately 1,400 feet. The existing channel capacity combined with overland flow provides an adequate outlet downstream.

Channel rights-of-way required for this construction will occupy about 5 acres along Channels M-2 and L-7D1. Channel rights-of-way in the area of adequate channels that require no construction, but will need maintenance by the Sponsors during the life of the project, occupy about 24 acres. This acreage is along about 1,500 feet, 9,500 feet and 9,300 feet respectively of Channels M-1 East, M-2, and M-6. These losses will be mitigated by the development of wetland wildlife habitat area of comparable size and will be extensively managed for waterfowl and crawfish and have habitat values which exceed the 29 acres lost during construction and maintenance. This area is located in Assumption Parish about three miles west of Bellerose on the edge of Type 1 Wetlands. The present condition is fairly typical of other bottomland hardwood areas. The area has been managed over a long period of time and contains bigger trees and more desirable tree species for wildlife. Overstory tree species include nuttall oak, willow oak, water oak, sweetgum, hackberry, swamp maple, and green ash. Understory species include reproduction from overstory species together with palmetto,

greenbrier, trumpetcreeper, peppervine, hawthorn, deciduous holly, roughleaf dogwood, rattan, elderberry, and blackberry. The wetland development will be orientated and managed primarily for crawfish and waterfowl management practices including shallow flooding of the area from October to about the middle of April, planting openings with browntop millet for crawfish and waterfowl food, and one original stocking of red swamp crawfish. It is not currently a wetland according to definitions in USDI Circular 39. It will be a manmade wetland (Type 1) after the levees, pump, and other appurtenances are installed and the management plan implemented. This area will be managed by the landowners as wetland for wildlife for the life of the project (50 years). The sponsors do not plan to provide public access to the newly constructed area inasmuch as the wetland being destroyed is on private land and public access was not provided. Providing public access would be enhancement instead of mitigation and would also increase the installation and operation and maintenance cost to the sponsors.

Specific measures will be used to minimize adverse effects to the plant, animal, and aquatic resources. These are:

1. Project channels located in forest land and those having wooded channel banks will be dug primarily from one side. The channels may have to be dug from both sides for some distances at locations such as bridges, utility lines, pipeline crossings, and along property lines. In selecting the side to leave, consideration will be given to quality of habitat and providing the most effective shade for channel water during summer months.

2. Excavation in forest land habitat will be minimized by utilizing the combination of existing channel and overbank flow capacities to provide adequate outlets for open land.

3. Selected trees will be left on the berms and channel banks for aesthetic and wildlife purposes (See figures 3 and 4, appendix E).

4. Areas disturbed by construction will be revegetated with a ground cover.

All disturbed areas, except spread spoil in cropland, will be vegetated with a perennial grass species designed to establish permanent vegetation. Spoil that will not be spread will be vegetated with perennial species immediately after it has been placed and shaped. When it is determined that spoil will be stacked and then later spread, the stacked spoil will be vegetated with an annual species for temporary protection. After the spoil is spread, perennial vegetation will be established on the spread spoil in all areas other than cropland.

Spoil spread on cropland will be seeded to temporary vegetation unless it is determined that the cover period will be too short to make seeding practical.

Spoil spread on pastureland will be seeded to the original permanent species present or as jointly agreed to by the landowner and the government representative. Depending upon soil type and season of the year, species such as common bermudagrass, Pensacola bahiagrass, browntop millet, ryegrass, and fescue will be used.

Selected trees will be preserved along channels for aesthetic and wildlife purposes. There are 60 miles of channel work through forest land and 17 miles through areas where woody vegetation exists along the banks adjacent to open land. Individual trees inside the channel rights-of-way may be aesthetically pleasing because of their large size, form, color, leaf texture, bark, or because of their flowering or fruiting characteristics. These trees will be left, giving consideration to requirements for construction, operation, and maintenance. (See figures 3 and 4, appendix E)

Structures for water control will be installed in side drains to reduce erosion. They will be installed in a manner that will permit equipment to cross during regular channel maintenance. The exact locations will be made in the operations stage (See figure 2, appendix F).

Some alteration, modification, or reconstruction of present facilities will be necessary to insure proper functioning of planned structural measures. These include, but are not limited to replacing, altering, or changing 3 bridges and 2 culverts on State and Federal highways, 24 bridges and 9 culverts and parish and private roads, pipelines at 68 locations, 37 utility lines, and 78 fences at about 115 locations. Replacement of any State and Federal highway bridges will be coordinated with the Louisiana Office of Highways during the construction phase of the project. Designs will be in accordance with current standards for traffic volume and type of highway. Alteration of pipelines and utility lines are made by the owner of the utility under the closest supervision possible with stringent safety precautions taken. There are no required relocations of residences or businesses.

The disposal of all construction debris and clearing wastes will be accomplished by burying, burning, or removal from the site. Burning operations, if necessary, will be conducted in accordance with the Louisiana Air Control Commission regulations and other applicable laws governing such operations. Noise levels will be monitored and standards of the Occupational Safety and Health Act will be followed.

All construction equipment will be properly equipped with noise resonators. Because of the type of work to be performed, this equipment will be widely dispersed throughout the watershed, rather than concentrated at any one location. Equipment will not be permitted to work when conditions are unsatisifactory for proper control of soil erosion and water, air, and noise pollution.

Berms will be established during construction in a manner to permit future maintenance of the channels. Culverts or bridges will be placed

in side drains as necessary to permit ingress and egress of maintenance equipment. The exact locations of measures for maintenance access will be made in the operations stage. Existing roads, farm roads, trails, and open terrain will be used at all possible places in lieu of constructing maintenance access facilities.

Biologists of the Louisiana Department of Wildlife and Fisheries, the U.S. Fish and Wildlife Service, and the Soil Conservation Service have studied the area. They recommend ". . . that boat access to existing waterways not be blocked by spoil deposits". The sponsors agree to carry out this request.

Structural measures for flood prevention and drainage are expected to be completed within a 3-year period.

Project measure installation will be conducted with emphasis on human health and welfare. Attention will be given to the prevention and control of vector-borne diseases and health problems associated with channel modification and water resource development projects.

The National Park Service will be notified if any previously unidentified cultural resource sites are discovered during detailed investigations or construction. The National Advisory Council on Historic Preservation will be given an opportunity to comment if such sites are determined to be eligible for inclusion in the National Register of Historic Places. This is in accordance with "Procedures for the Protection of Historic and Cultural Properites." Since this is a federally assisted local project, there will be no change in the existing responsibilities of any federal agency under Executive Order 11593 with respect to archaeological and historical resources.

Operation and Maintenance

The installation and maintenance of the land treatment measures is the reponsibility of the individual landusers. The Lower Delta Soil and Water Conservation District, with technical assistance from the Soil Conservation Service, will assist and encourage landusers to maintain the land treatment measures. The Louisiana Forestry Commission, in cooperation with the U.S. Forest Service, will furnish the technical assistance necessary for operating and maintaining the forest land treatment measures under the going Cooperative Forest Management Program.

Operation and maintenance of all phases of the completed structural measures will be the responsibility of the Ascension, Assumption, and Iberville Parish Police Juries within their respective parishes. They will maintain the 168 miles of project channels to be worked, together with appurtenant structures. They will continue to maintain the adequate flow conditions of those project channels that are now adequate (47 miles) as indicated on the Project Map, Appendix C. The methodical operation and maintenance of structural measures will insure proper functioning of these measures and realization of benefits.

Channel maintenance includes periodic cleanouts necessary to restore channels to their planned capacities, repair of bank erosion, control of vegetation, and repair or replacement of appurtenant structures. Maintenance of structures for water control includes repairing rills around headwalls or wingwalls, maintaining or replacing vegetation on fills, repairing worn or broken parts, replacing short-life parts, and all other activities essential to the safety and functioning of the structure. The aesthetics of the channel and structures sites shall be an important consideration of the maintenance program.

Annual operation and maintenance expenses for the 215 miles of project channels, including the replacement of worn out or obsolete parts, are estimated to be $157,400. The Ascension, Assumption, and Iberville Parish Police Juries will be responsible for this cost.

The present maintenance tax for drainage is considered adequate for maintaining channels and associated works. Should these funds prove inadequate, the sponsors have agreed to provide additional funds by an increase in revenue from normal taxing procedures.

Existing public roads, farm road, turnrows, trails, open areas, and other existing facilities will be used as travel access for maintenance equipment. Sufficient access will be available to properly maintain all channels. The channels will be kept clear of excessive vegetation by use of approved herbicides and hand labor. Spraying will be accomplished in the summer months when the channels are most likely to have the least flow. Spraying during these months will lower the probability of runoff carrying undergraded herbicides into other areas. Eroded banks, side inlets, and other appurtenances will be repaired when in need. Localized sediment accumulations in channels, with and without weirs, will be removed periodically by mechanical means. Use of these techniques should result in a channel maintenance program that is environmentally acceptable.

Vegetation remaining on channel banks not disturbed during construction will be maintained. Trees left in channel rights-of-way for landscape purposes will not be destroyed by maintenance methods. Two complete mechanical cleanouts are anticipated during the life of the project.

Provisions will be made for representatives of the Soil Conservation Service, the Louisiana Office of Public Works, and the sponsors to have free access to all portion of the project measures at any reasonable time for the purpose of inspection, repair, and maintenance. The sponsors and representatives of the Soil Conservation Service will make a joint inspection annually, after severe storms, and after the occurrence of any other unusual condition that might adversely affect the structural measures. These joint inspections will continue for three years following installation of the structural measures. Inspections after the third year will be made by the sponsors. They will prepare an annual report and send a copy to the Soil Conservation Ser-

vice. Items of inspection will include, but will not be limited to: (1) conditions of vegetative cover and growth, (2) need for removal of sediment bars and debris accumulations, (3) brush control in channels, (4) structures for water control, (5) conditions of wetland development, and (6) general conditions.

The sponsors fully understand their obligation for operation and maintenance and will prepare a plan and execute a specific operation and maintenance agreement with the Soil Conservation Service prior to the execution of the project agreement for the installation of project measures. The operation and maintenance agreement will include specific provisions for retention and disposal of property acquired or improved with Public Law 566 financial assistance. (See an example of this type of agreement, appendix F.)

Project Costs

The total installation of the project is estimated to be $12,047,680; $8,148,400 is for land treatment measures and $3,899,280 is for structural measures. Since the watershed was approved for operation, $1,451,100 has been used to install part of the land treatment program. Of the $6,697,300 remaining, $1,400,600 is for technical assistance ($964,600 from Public Law 566 funds and $436,000 from other funds). The remaining $5,296,700 will be borne by the individual landusers to install the needed land treatment measures. The total cost of structural measures is $3,899,280; $2,259,270 will be borne by P.L. 566 and $1,340,010, by other funds. The estimated benefit-cost ratio is 4.0:1.

ENVIRONMENTAL SETTING

Physical Resources

The Lake Verret Watershed is in the central Gulf Coast area of Louisiana. It lies across the Mississippi River and south of Baton Rouge. It is bounded on the north by the high bank of Bayou Plaquemine and the Mississippi River levee; on the east by the high bank of Bayou Lafourche; on the west by Grand River, Bay Natchez, and Belle River; and on the south by Lake Verret to the Lafourche Parish line. Plaquemine, Donaldsonville, White Castle, and Napoleonville are incorporated towns in the watershed. Several smaller communities are in the area.

There are two other operational P.L.-566 watershed projects that are hydrologically associated with the Lake Verret Watershed - Bayou Grosse Tete and Choctaw Bayou. Both are located to the north in either Pointe Coupee or West Baton Rouge Parishes. The outlet for the Bayou Grosse Tete Watershed is Bayou Grosse Tete which drains into Lower Grand River. The outlet for the Choctaw Bayou Watershed is Choctaw Bayou which emoties into the Intracoastal Waterway southwest of Port Allen, Louisiana.

The cumulative downstream stages with projects installed are discussed and shown in tabular form on page 70.

The watershed covers 246,000 acres, which include 22,300 acres (34.84 square miles) in Ascension Parish, 104,500 acres (163.28 square miles) in Assumption Parish, and 119,200 acres (186.25 square miles) in Iberville Parish. About 37 percent of the area is cropland; 4 percent is pastureland; 51 percent is forest land; and 8 percent is in miscellaneous uses. The miscellaneous area includes roads, channels, industrial sites, farmsteads, urban areas, etc. The urban areas include several small communities located along the high banks of the large bayous.

The agricultural lands are highly productive. However, frequent and prolonged flooding and inadequate drainage cause considerable damage to crops and add to the cost of production. The problems caused by flooding and inadequate drainage in relation to sugarcane production are discussed on pages 56 and 57. Certain sections within the western area of Donaldsonville are subject to severe damage from flooding and prolonged wetness.

The watershed is generally low flatland, with elevations ranging from approximately 20 feet above mean sea level in the north to less than 2 feet above mean sea level in the south. The higher land adjacent to the Mississippi River and the ridges along the many streams are highly developed agriculturally.

Internal drainage is through a series of bayous and canals which have Lake Verret as a common outlet. Drainage is generally toward the

west and south, away from the high banks of Bayou Lafourche and the Mississippi River. Characteristic of streams in the low-lying coastal lands, the channel gradients are low. Storm runoff from Lake Verret is through a series of lakes and bayous connecting with the Gulf of Mexico.

The watershed is located in the Atchafalaya River Basin of the Lower Mississippi River Region. The topography, climate, and problems are fairly typical of other flatland watersheds in the alluvial valley of this region.

The watershed is in the Southern Mississippi Valley Alluvium Major Land Resource Area.[1/] The principal soil associations are Commerce-Convent, Sharkey-Tunica, and Sharkey-Swamp (See General Soil Map on the following page).

The Commerce-Convent association comprises approximately 24 percent of the watershed. It is used mostly for cropland, pastureland, and urban and built-up. These are nearly level, loamy soils that are high in natural fertility. They are easy to work and keep in good tilth, but they are likely to become cloddy if worked when wet. Crops respond well to fertilizers. There is no restriction in cropping sequence, if adequate fertilizers are applied and crop residues are managed. These soils are in Capability Subclass IIw. They are used mostly for sugar-cane production.

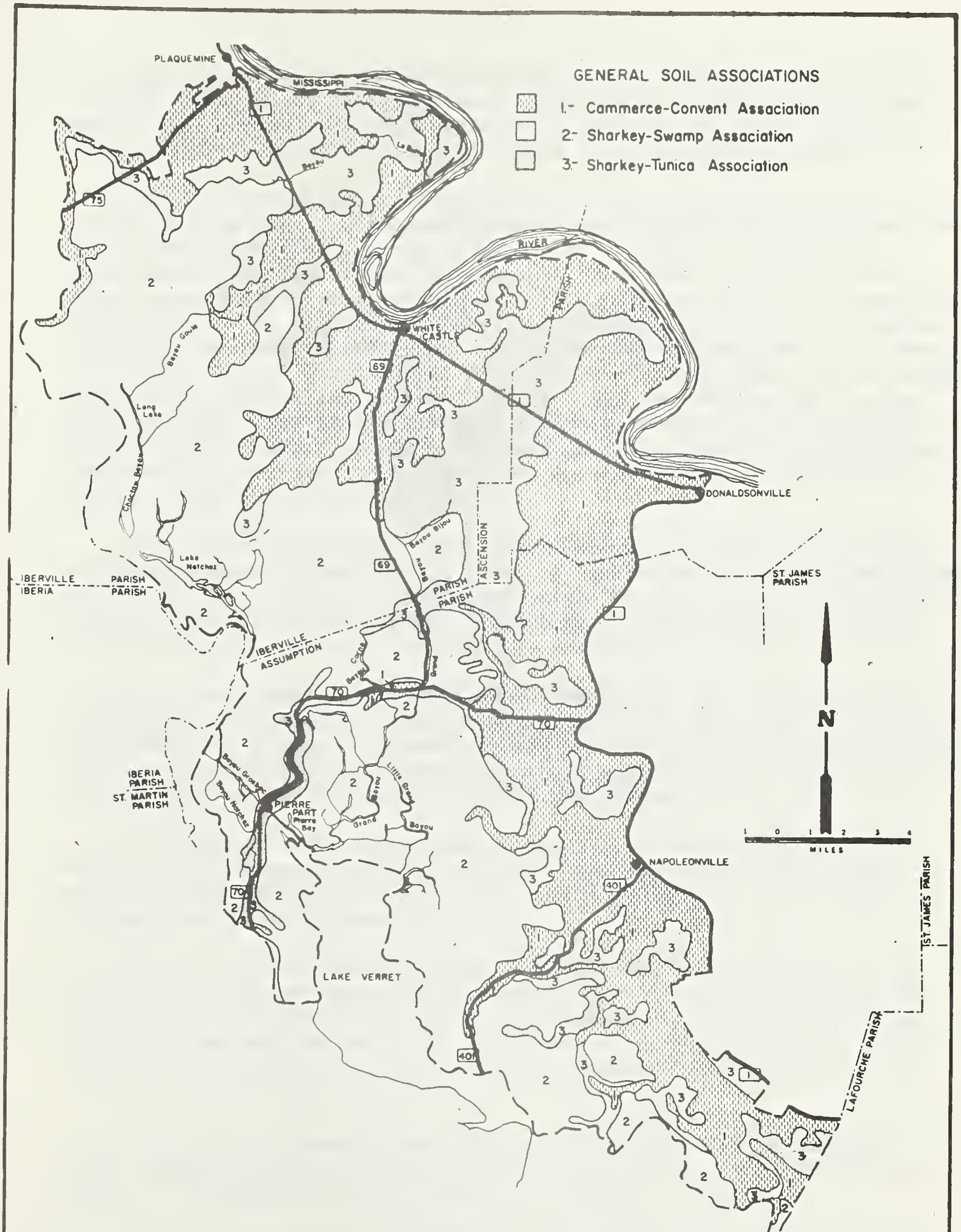
Drainage and the formation of plow pans are the major management problems. Drainage land grading or land smoothing with proper outlets will imprvoe surface drainage and increase the efficency of farm equipment. The plow pans can be broken up by chiseling or deep plowing.

The Sharkey-Tunica association comprises about 16 percent of the watershed. These are poorly drained clayey soils that occur on level to nearly level areas. They are used mostly for cropland and pasture, while some areas are still in bottom land hardwood. They are high in natural fertility and are difficult to work. Crop response to fertilizers is good, but limited variety of plants are adapted to these soils. They are in Capability Subclass IIIw.

Removal of excess surface water is the major management problem. With proper outlets, practices such as drainage land grading, land smoothing, and bedding will aid in eliminating this problem.

The Sharkey-Swamp association comprises about 60 percent of the watershed. These soils occur on level or low areas that are subject to frequent flooding or usually have water at or above the surface. They are used for forest land and wildlife habitat.

1/ U.S. Department of Agriculture, Soil Conservation Service, Land Resource Regions and Major Land Resource Areas of the United States, Agriculture Handbook No. 296 (Washington: U.S. Government Printing Office, 1965), p. 69.



General Soil Map
LAKE VERRET WATERSHED
Ascension, Assumption, and
Iberville Parishes, Louisiana

Compiled from SCS General Soil Map of Ascension, Assumption, and Iberville Parishes, Louisiana

U S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ALEXANDRIA, LOUISIANA
1976

SETTING

The general soils map shows the major soil associations in relation to other features of the landscape. This map is useful to people who want: (1) a general idea of the soils in an area, or (2) to determine the suitability of soils to certain land uses for general planning.

The information of a soil map must be explained in a way that has meaning to the user. These explanations are called interpretations. The capability classification system is one of a number of interpretive groups made for agricultural purposes.[2/] This system provides three major categories of soil groupings: (1) capability unit, (2) capability subclass, and (3) capability class. The capability unit is a grouping of soils that respond about the same to systems of management of common cultivated crops. The subclass is a grouping of capability units having similar limitations and hazards. Erosion (e) and wetness (w) are the kinds of limitation that soils have in this watershed. The capability class is the broadest category in the capability classification systems. The risks of soil damage or limitation in use become progressively greater from Class I to Class VIII.

The average annual precipitation of about 59 inches is generally well distributed throughout the year. Nevertheless, rainfall during any period may vary greatly from year to year. On the average, the month with lowest rainfall is October, with a mean value of about 3 inches. Yet, in the past, October rainfall has exceeded 20 inches.

The mean annual runoff of about 27 inches is high compared to the United States as a whole. About three-fourths of this runoff occurs in the winter and spring. Because of high summer evapotranspiration rates and varying rainfall conditions, alternating periods of drought and excess moisture in the summer and fall are common.

Mean temperatures range from 56 degrees Fahrenheit (13°C) in January to 83 degrees (28°C) in August. The extreme recorded temperatures were 103 degrees (39°C) and 3 degrees (16°C). The average growing season is 284 days.[3/]

Land use in the water problem areas is similar to that in those areas where drainage and flood prevention are considered adequate. As explained in the description of soils, the more elevated soils are in cropland, pastureland, or other land. Trees in these areas are found along some channels, fence rows, houses, or other small tracts.

2/ U. S. Department of Agriculture, Soil Conservation Service, Land Capability Classification, Agriculture Handbook No. 210 (Washington: U.S. Government Printing Office, 1961), pp. 6-10.

3/ U.S. Department of Commerce, Weather Bureau, Climates of the States - Louisiana, No. 60-16 (Washington: U.S. Government Printing Office. 1959), pp. 5, 7.

The present land use is as follows:

Land Use	Acres	Percent
Cropland	90,200	37
Pastureland	9,100	4
Forest land	125,500	51
Other land 1/	21,200	8
Total	246,000	100

1/ Includes roads, channels, industrial sites, urban and rural communities, farmsteads, rights-of-way, etc.

Forest land makes up 51 percent of the watershed. The major forest type is bottom land hardwoods. Differences in vegetation on the flats and sloughs are pronounced.

Principal forest type on the wet sites is oak-gum-cypress. Water oak, sweetgum, and hackberry dominate the other sites.

Common understory species are the seedlings of the overstory, switchcane, swamp-privet, trumpetcreeper, greenbrier, wild grape, poison-ivy, and honeysuckle.

Of the 125,000 acres of forest land within the watershed, about 30,000 acres, or 24 percent, are industrially owned or managed. The remaining 95,500 acres are individual forest ownerships and small onfarm tracts averaging about 10 acres of forest per farm. About 80 percent, or 100,500 acres, are seasonally flooded basins or flats or wooded swamps. Logging is extremely difficult on these wet sites. There is further difficulty from standing water which prevents regrowth in the logged sites.

Much of the forest has been repeatedly cut over with little regard for future timber production. The cutting practices have resulted in stands composed of trees of low quality and inferior species. Access to the existing forest land resource is difficult. The majority of the forest land is posted and leased to hunting clubs. Limited acreage is available without fee to the general public for hunting. All-weather roads for access to forested areas are limited. Despite this inconvenience, use of the existing forest wildlife resource is heavy. The demand for forest land acreage to lease for hunting is increasing. Membership in local hunting clubs by persons from outside the watershed is quite common.

Lake Verret Watershed is located within the area of recent alluvium deposits of the Quaternary System. The natural levees of the Mississippi River and Bayou Lafourche, an abandoned Mississippi River channel, form the highest elevations. Over 1,000 years ago, the Mississippi River shifted east to its present location, and Bayou Lafourche became a high flow distributary stream. The construction of the present Missis-

sippi River levee stopped all distributary flow into Bayou Lafourche. There is a pumping plant at Donaldsonville that pumps water from the Mississippi River into Bayou Lafourche for industrial and municipal water supply.

The watershed lies near the axis of the Gulf Coast Geosyncline and near the axis of the Mississippi Embayment Syncline. The Red River Fault Zone has influenced the area.

Both sheet and gully erosion are prevalent. Sheet erosion is the dominant form and amounts to approximately 1,026,000 tons of material per year (4.17 tons per acre per year for the watershed). Small gullies occur on the sugarcane land. It is caused by digging quarter drains to a level slightly below the bottom level of the furrows. This creates a slight overfall. Small gullies also occur where quarter drains enter deeper field (split) ditches. Gully erosion amounts to about 460,000 tons per year. Total sheet and gully erosion amounts to approximately 1,486,000 tons per year.

Most of the sediment is deposited near the source of the erosion. About 1,016,000 tons of the sediment is deposited in the ditch system in or adjacent to the yielding fields. Deposition in Grand Bayou amounts to approximately 29,000 tons per year. The swamp north of Highway 70, in the vicinity of Grand Bayou, receives approximately 29,000 tons per year. Deposition in Lake Verret is very minor, the detectable amount is located as deltas near the mouths of channels entering the lake and amounts to about 20,000 tons per year. The remainder of the sediment (392,000 tons/year) is deposited in main channels, other portions of the swamp, and Lake Natchez. No measurable sediment in Grassy Lake or Lake Palourde could be found identifiable with the erosion occuring in the watershed.

The Town of Plaquemine, located in the extreme northern portion of the watershed, has six wells: Ib-30, -60, and -61 (standby wells screened in alluvium of Pleistocene age), and WBR-111, -112, and -113, screened in sands of Miocene age. The following is the chemical analyses of the water from two of these wells:[4/]

Well No.	WBR-111	WBR-112
Depth	2,650 feet	2,205 feet
Aquifer	Miocene	Miocene
Date of Collection	1-11-68	1-12-68
Chemical Constituents (milligrams per liter)		
Silica (SiO_2)	19	49
Iron (Fe)	0.23	0.06
Calcium (Ca)	.3	.0

[4/] Ibid.

Magnesium (Mg)	.3	.0
Sodium (Na)	246	85
Potassium (K)	.5	.3
Bicarbonate (HCO_3)	564	166
Carbonate (CO_3)	26	17
Sulfate (SO_4)	.2	10
Chloride (Cl)	3.2	3.6
Flouride (F)	2.6	.4
Nitrate (NO_3)	.0	.0
Dissolved Solids	588	251
Hardness as $CaCO_3$	2	0
Noncarbonate hardness	0	0

Physical Properties

Specific Conductance (micromhos at 25°C)	940	347
Color	60	0
pH	8.7	8.7
Temperature (°F)	96	87
Temperature (°C)	36	31

The Town of White Castle, also in the northern portion of the watershed, obtains its water from two wells, IB-23 (standby) and Ib-196 screened in Mississippi River alluvium of Pleistocene age.[5/] The following is a partial chemical analysis of water from well Ib-196.[5/]

Depth: 250 feet
Aquifer: Alluvium
Date of Collection: 3-2-66

Chemical Constituents
(milligrams per liter)

Sodium (Na)	17
Sulfate (SO_4)	5.4
Chloride (Cl)	7.6
Hardness as $CaCO_3$	118

Physical Properties

Specific conductance (micromhos at 25°C)	289
Color	15
Temperature (°F)	68
Temperature (°C)	20

[5/] Ibid., pp. 158.

SETTING

The Town of Donaldsonville obtains its water from the Mississippi River. The following is a chemical analysis of both the raw and treated water:[6/]

Chemical Constituents (milligrams per liter)	Raw Water	Finished Water
Silica (SiO_2)	4.2	2.6
Iron (Fe)	.00	.01
Calcium (Ca)	32	35
Magnesium (Mg)	11	3.1
Sodium (Na)	14	14
Potassium (K)	2.7	2.6
Bicarbonate (HCO_3)	96	20
Carbonate (CO_3)	0	0
Sulfate (SO_4)	46	90
Chloride (Cl)	19	18
Fluoride (F)	.2	.2
Nitrate (NO_3)	.3	3.2
Dissolved Solids	186	184
Hardness as $CaCO_3$	125	100
Noncarbonate hardness	46	84
Physical Properties		
Specific conductance (micromhos at 25°C)	303	286
Color	15	10
pH	7.1	7.4

While fresh ground water is available from the Mississippi alluvium at Donaldsonville, this is about the southern limit for fresh ground water. A possibility of fresh ground water from the Quaternary System exists at the extreme southern end of the watershed, but the center portion of the watershed has no large fresh ground water supply.[7/]

Wetlands, as described in USDI Circular 39,[8/] make up 101,030 acres. Three wetland types are present and include Types 1, 5, and 7. Type 1 Wetlands are seasonally flooded hardwoods and total 51,500 acres. Type 5 Wetlands are open lakes and ponds up to 10 feet deep. Cypress-tupelogum

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6/ Ibid., p. 27.

7/ Ground water in Louisiana, Water Resources Bulletin No. 1, published by Department of Conservation, Louisiana Geological Survey and Louisiana Department of Public Works, Baton Rouge, Louisiana, 1960.

8/ U.S. Department of the Interior, Fish and Wildlife Service, Wetland of the United States, Circular No. 39 (Washington: U.S. Government Printing Office, 1956), pp. 20-22.

brakes represent the Type 7 wetlands. The following tabulation gives the wetland type, description and acreage:

Type	Description	Acres
1	Seasonally flooded basins or flats	51,500
5	Inland open freshwater	530
7	Wooded swamps	49,000
	Total	101,030

Wetlands are unique ecosystems and serve many valuable functions. They furnish habitat for numerous species of fish and wildlife. Wetlands and associated vegetation also act as cleansing agents to remove undesireable pollutants from water, stabilize runoff, reduce or prevent erosion, and produce timber. The wooded swamp and seasonally flooded bottomlands also contribute nutrients and organic detritus to adjacent Lake Verret, which aids in biological productivity.

The Louisiana Stream Control Commission has established quality standards for certain streams and water bodies within the state. "The quality criteria for the waters of Louisiana are based on their present and potential uses and the existing water quality indicated in data accumulated through monitoring programs of various agencies." 9/ Lake Verret and Grand Bayou are the two water bodies that have quality standards in this watershed. The general and specific criteria for these two water bodies are appendix I of this document.

The surface water quality parameter tabulation presented on pages 35 and 36 shows the dissolved oxygen content of water samples as well as several other parameters. Ammonia nitrogen levels, above the 0.2 mg/1 normally a sign of polluted waters, occur at several sampling stations. Phosphate (ortho) readings were high for station no. 5 (Bayou Sigur) during November 1974 and August 1975. See the map on page 37 for locations of water sample stations.

According to the National Eutrophication Survey conducted by the EPA, inorganic nitrogen to orthophosphorus ratios (N/P) in Lake Verret were 3/1 or less on all sampling occasions, which indicates Lake Verret is nitrogen limited. The low N/P ratios are a result of high orthophosphorus levels.

A pesticide monitoring program has been in progress since July 1973. The tabulation on pages H-2 to H-5 of appendix H gives the results received to date. Residue levels are below the tolerance limits established for DDT and its metabolites (5 ppm for edible parts). Suggested guidelines for toxaphene are also 5 ppm. None of the samples exceeded this level. The proposed guidelines for aldrin, dieldrin, and

9/ State of Louisiana, Louisiana Stream Control Commission, State of Louisiana Water Quality Criteria, 1973, p. 66.

LAKE VERRET WATERSHED - WATER QUALITY

	Color units	Hardness mg/1 ($CaCO_3$)	Nitrogen ammonia mg/1 (N)	Nitrogen nitrate mg/1 (N)	Oxygen mg/1 (O_2)	Phosphate ortho mg/1 (PO_4)	pH units	Sulfate mg/1 (SO_4)	Sulfide mg/1 (S)	Suspended Solids mg/1	Temperature °F	Turbidity FTU's
	Apparent											
1973												
11/30 Station No. 1 1/	225	92	0	.13	8	.45	8.0	21	.10	35	--	85
11/30 Station No. 2	140	95	0	.07	8	.30	8.5	22	.05	10	--	45
11/30 Station No. 3	205	78	0	.18	6	.20	7.5	17	.07	22	--	90
11/26 Station No. 4	65	--	0	.03	4	.82	7.5	18	.03	5	--	28
11/28 Station No. 5	95	--	0	.02	6	.80	8.0	28	.03	14	--	38
1974												
6/25 Station No. 1	40	123	--	.19	4	.30	8.0	35	.03	2	76	20
6/25 Station No. 2	120	112	--	.02	9	.25	9.0	22	.03	18	78	42
6/27 Station No. 3	82	102	--	.02	9	.25	9.0	18	.00	20	78	30
6/24 Station No. 4	80	98	--	.25	9	.15	8.0	12	.03	10	82	25
6/28 Station No. 5	200	92	--	1.75	5	.60	9.0	17	.13	35	82	75
1974												
11/22 Station No. 1	45	130	.03	.19	13	.15	9.0	50	.04	0	69	22
11/22 Station No. 2	60	116	.10	.02	14	1.00	9.0	40	.05	2	67	30
11/22 Station No. 3	90	110	.25	.04	11	.17	9.0	30	.05	10	66	35
11/21 Station No. 4	1,050	98	1.60	1.20	2	1.55	6.5	--	.26	260	68	355
11/21 Station No. 5	950	140	1.40	.90	4	3.20 2/	7.5	--	.18	280	72	320
	True											
1975												
6/26 Station No. 1	50	92	.25	.10	5	.62	7.0	18	dis-	3	81	20
6/26 Station No. 2	55	64	.40	.35	7	.08	7.0	11	continued	5	85	25
6/26 Station No. 3	18	68	.78	.15	9	.18	8.0	18		2	84	22
6/26 Station No. 4	25	52	.95	.25	4	.42	7.0	11		60	81	115
6/26 Station No. 5	25	80	.85	.60	7	.55	7.5	16		58	82	95

	Color units	Hardness mg/l ($CaCO_3$)	Nitrogen ammonia mg/l (N)	Nitrogen nitrate mg/l (N)	Oxygen mg/l (O_2)	Phosphate ortho mg/l (PO_4)	pH units	Sulfate mg/l (SO_4)	Sulfide mg/l (S)	Suspended Solids mg/l	Temperature °F	Turbidity FTU's
1975												
8/27 Station No. 1	25	84	.50	.15	3	.48	6.8	17		10	--	33
8/27 Station No. 2	20	58	.40	.10	3	.20	6.8	10		20	--	50
8/27 Station No. 3	22	60	.95	.20	2	.28	6.8	8		10	--	42
8/27 Station No. 4	20	--	1.35	.20	3	.50	6.8	--		40	--	100
8/27 Station No. 5	18	25	7.00	.25	3	20.00 2/	7.0	10		140	--	240
1976												
9/27 Station No. 1	10	120	.65	.20	4	.75	8.3	58		15	81	40
9/27 Station No. 2	20	128	.55	.50	5	.25	9.3	53		10	80	40
9/27 Station No. 3	20	160	.60	.00	5	.60	8.4	50		18	77	42
9/27 Station No. 4	20	140	.30	.00	9	.05	8.5	56		5	81	35
9/27 Station No. 5	20	130	.38	.30	5	.15	8.0	19		5	75	25

1/ Station No. 1 = Lake Palourde
Station No. 2 = Grassy Lake
Station No. 3 = Lake Verret
Station No. 4 = Grand Bayou
Station No. 5 = Bayou Sigur

2/ The location of Sampling Station No. 5 is immediately downstream of a bridge crossing. Possibly something was dumped at this crossing which caused these two high orthophosphate readings.

WATER QUALITY SAMPLE STATIONS

△

1. Lake Palourde
2. Grassy Lake
3. Lake Verret
4. Grand Bayou
5. Bayou Sigur

endrin are .3 ppm. Again, none of the samples contained this amount of either aldrin, dieldrin, or endrin. Tolerance limits for the other pesticides listed have not been established.

A pesticide usage survey was conducted in the project area in 1973. Results of this survey can be observed on appendix H-6. This survey indicates the use of "shorter-life" pesticides compared to what has been previously used. Residue levels in the fish and sediments indicated previous use of chlorinated hydrocarbons.

The Southern Louisiana area is a nonattainment area for photochemical oxidants since the national standard of 0.08 parts per million (ppm) has not been achieved. The 1975 oxidant air quality data showed 0.170 ppm for Baton Rouge (12 miles from project); 0.094 ppm for New Orleans (45 miles from project); and 0.174 ppm at Lake Charles (112 miles from project). These values are the second highest values recorded.

Present and Projected Population

The watershed population based on 1970 census data is about 38,600: about 3,700 reside in Plaquemine, 2,200 in White Castle, 2,600 in Donaldsonville, and the remainder in the rural areas. There are numerous other small communities scattered throughout the watershed. Baton Rouge, the state capital with a population of about 166,000, is to the north, on the east side of the Mississippi River.

Data obtained from the 1970 Census of Population revealed that Ascension, Assumption, and Iberville Parishes had a population of 87,500. Of this total, 55,500 (63 percent) were white, and 32,000 (37 percent) nonwhite.[10/]

The projected 1990 population for the above-mentioned parishes [11/] is 132,300, of which 92,000, (70 percent) will be white and 40,300 (30 percent) will be nonwhite. This indicates that the expected 1990 population will be about 44,800 persons more than the 1970 population. About 36,500 of these will be white, and 8,300 will be nonwhite.

Economic Resources

There are three broad categories of industries in the economy of any region: (1) basic industries such as farming, mining, and forestry,

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[10/] James R. Bobo and Jesse M. Charlton, Jr., Statistical Abstract of Louisiana (4th ed., New Orleans: Division of Business and Economic Research, College of Business Administration, Louisiana State University at New Orleans, 1971).

[11/] Georgios C. Christou and Harris S. Segal, Population Projection to 1980 and 1990 Louisiana and Its Parishes, Research Study No. 18, Division of Business and Economic Research, College of Business Administration, Louisiana State University in New Orleans, (Baton Rouge, Louisiana, 1973).

which are based on natural resources; (2) processing industries, such as grain elevators, sugar mills, petroleum refining plants, and lumber mills, which depend on the basic industries; and (3) service industries, such as wholesale and retail stores, communications, transportation, medicine, etc., which are based on the other two industries as well as their own members.[12/]

A significant part of the economy of the watershed is based on agriculture. Crop production, the most important part of agriculture, is followed by forestry and fisheries. The major farm and ranch enterprises are sugarcane, soybeans, and pasture. Agriculturally related industries include sugar processing facilities, grain elevators fertilizer mixing plants, agricultural flying services, tractor and equipment dealers, and others. Most of these are located in nearby towns.

Estimates based on the 1970 Census of Population indicate that the labor forces within the watershed in Ascension, Assumption, and Iberville Parishes are 10,800, 4,900, and 8,000 respectively. Of these, about 5.6, 7.3, and 8.5 percent, respectively, were unemployed. An average of the three parishes involved shows that employment in agriculture, forestry, and fisheries was about 4.3 percent; mining, 1.9 percent; construction, 13.2 percent; manufacturing, 24.5 percent; and the remaining 56.1 percent in other sectors of the economy. The median family income is $5,170.

Approximately 8,700 (28 percent) of the population in Iberville Parish are of minority groups. About 10 percent are farm families, and 74 percent are rural nonfarm residents. The median years of school completed by adults in these groups is 8.7 years.

The following minority conditions apply similarly to the watershed:

> In Iberville Parish about 68 percent of those below the poverty level are of the minority races.
>
> The median income for those minorities in agriculture is about $2,093 per family. This compares to the median family income of $3,359 for the minority population of the parish as a whole, this is less than the median family income for the parish, which is $6,251.

According to Service data, there are 47 minority landusers within the watershed, farming 2,067 acres of land. Of these, 26 are cooperating with the soil and water conservation district program on 1,529 acres. These 47 minority landusers amount to 8 percent of the landusers.

12/ Gerald A. Doeksen, Robert E. Daughtery, and Charles H. Little, "Multiplier Effects of Agriculture and Other Industries," OSU Extension Facts, Science Agriculture No. 808 (Stillwater: Oaklahoma State University). pp. 808-808.1.

An additional 63 minority families have homes located in the western urban flood plain of Donaldsonville amounting to 48 percent of the families living in this area.

The number of farms is decreasing and the size of farms is increasing. The following data from the 1969 Census of Agriculture showing farms grouped by size for Ascension, Assumption, and Iberville Parishes prove this trend.

	Ascension		Assumption		Iberville	
	1964	1969	1964	1969	1964	1969
Farm Size	No.	No.	No.	No.	No.	No.
Under 50 acres	604	115	98	25	138	62
50 to 99 acres	134	72	34	33	49	51
100 to 179 acres	74	44	40	40	57	43
180 to 259 acres	29	17	30	30	37	30
260 to 499 acres	61	16	31	32	29	50
500 and over	113	29	37	34	49	50
Total	1,015	293	270	194	359	286

Sugarcane is the principal crop grown in the area. The average FUTURE WITHOUT PROJECT yields per acre on problem area soils is expected to be about 26 tons of sugarcane, and 25 bushels of soybeans.

Sugarcane acres in Ascension, Assumption, and Iberville Parishes increased about 15,000 acres between 1940 and 1970. From 1960 to 1970, soybean acreage increased from about 200 to 20,400 acres in these parishes. This results in the reduction of forest land as well as land in other agricultural uses.

Data from the 1969 Census of Agriculture indicated that there were approximately 350 farms in the watershed averaging 370 acres per farm. Over 84 percent of these farms are family type and distributed throughout the watershed.

Most of the homes outside the towns of Plaquemine, Donaldsonville, and Napoleonville are built along the high banks of old bayous which meander through the area. At the time of settlement, the principal means of transportation was by boat along these streams. The land along these bayous was higher and flooded less frequently. Early homes were built on the highest ground. For this reason, many farms are long, narrow strips of land. In many instances the farm may be less than one-eight of a mile wide and as much as 3 miles long.

Rural land values based on 1976 prices range from an estimated $1,000 to $1,500 per acre. These values depend on intended use, location, soil type, degree of drainage, and other conservation measures applied. Industrial and urban land values are estimated at $1,500 and $5,000 per acre, respectively. Some front land, previously in sugar-

cane, recently sold for $7,600 per acre for residential use. Public land consists of 1,280 acres for the watershed. The Assumption and the Iberville Parish School Boards each administer 640 acres.

The watershed is crossed by Louisiana Highway 1. State and parish secondary roads radiate from this highway providing access to farms and markets. The Texas and Pacific and Southern Pacific Railroads generally parallel the highway.

The watershed is within and compatible with the operational Capital Resource Conservation and Development Project.

The watershed is within the Lower Mississippi Region Comprehensive Study Area and the Atchafalaya River Basin Study Area. The project plan is compatible with the objectives of the studies. The three parishes involved in this watershed are eligible for assistance under the Public Works and Economic Development Act of 1965.

An alternate route of the Intracoastal Waterway, along the western watershed boundary, connects the Intercoastal Waterway at Morgan City with the Mississippi River at Baton Rouge. A large tonnage of barge traffic moves over this waterway. Bayou Lafourche also handles a considerable amount of barge traffic to Thibodaux, which is near the watershed. This bayou also furnishes a source of water for the sugarcane mills and for the water districts which provide water for human consumption.

Plant and Animal Resources

Four vegetative communities are present and include agricultural fields, swamp, bottomland hardwoods, and seasonally flooded bottomland hardwoods. The following discussion contains the acreage of each community and the typical plant species.

Agricultural Fields - Open agricultural fields comprise 99,300 acres. Cropland, primarily sugarcane, totals 90,200 acres and pastureland occupies 9,100 acres. Native annual plants are sparse in the sugarcane fields because of cultural practices. Plants such as panic grasses, paspalums, crabgrass, bluestems, foxtail, dewberry, trumpet-creeper, and Japanese honeysuckle grow along the ditch banks and field edges. Pasture plants present are common bermudgrass, dallisgrass, white clover, and fescue.

Swamp - This plant community occupies 49,000 acres. The majority of this acreage has several inches of water on the surface. Frequent flooding occurs on the remaining acreage due to runoff from higher areas. Plants in the overstory are baldcypress, tupelo gum, and red maple. Species described in the bottom land hardwood community are present on spoil banks. Buttonbush and rattlebox are common in the understory along the edges and small openings. Waterhyacinth and duckweed are common on the flooded areas. This swampy plant community is

classified as a Type 7 Wetland. This is excellent wildlife land, and because of the ownership pattern and water level, it is expected to remain as such.

Bottomland Hardwoods - The bottomland hardwood plant community occupies 25,000 acres. It occurs on the higher elevations between the seasonally flooded hardwoods and the open agricultural fields. Plant species in the overstory are willow oak, honeylocust, Nuttall oak, Carolina ash, green ash, water oak, sweetgum, live oak, boxelder, and hackberry. Understory species include hawthorn, deciduous holly, rough-leaf dogwood, palmetto, blackberry, elderberry, rattan, peppervine, wax myrtle, swamp-privet, greenbrier, and ferns. This plant community contains some of the best wildlife habitat in the project area.

Seasonally Flooded Bottomland Hardwoods - This plant community is in close association with the swamp and totals 51,500 acres. It is located between the baldcypress-tupelo gum swamps and the drier bottomland hardwood plant communities. Species composition is similar to that already described for the bottomland hardwood plant community except this community contains overcup oak, baldcypress, bitter pecan, and red maple in the overstory. Also it is seasonally flooded and classified as Type 1 Wetland.

Wildlife resources are excellent. White-tailed deer and black bear are the big game animals present in this habitat. Wild turkeys were stocked in 1970 and 1971 by the Louisiana Wild Life and Fisheries Commission. The Commission allowed hunting of turkeys during 1977 in portions of the watershed area. Small game species present include squirrels, rabbits, dove, quail, snipe, woodcock, coots, rails, gallinules, and numerous species of waterfowl. Mink, raccoon, muskrat, and bobcat are some indigenous furbearers. The tabulation on page 43 gives the current estimated populations of some forest and openland game species. Numerous species of nongame animals also utilize forest and openland habitat. Data are not available for populations of nongame animals.

Other common mammals, birds, reptiles, and amphibians present are as follows:

1. Mammals - Otter, nutria, striped skunk, gray fox, red bat, armadillo, cotton rat, oppossum, marsh rice rat, fulvous harvest mouse, and Eastern wood rat.

2. Birds - Red-shouldered hawk, red-tailed hawk, sparrow hawk, marsh hawk, Northern cardinal, house sparrow, common flicker, Eastern bluebird, Eastern meadowlark, brown thrasher, white-eyed vireo, blue jay, belted kingfisher, loggerhead shrike, little blue heron, great blue heron, Louisiana heron, barred owl, pileated woodpecker, red-headed woodpecker, common grackle, mallard, wood duck, blue-winged teal, green-winged teal, lesser scaup, canvasback hooded merganser, pintail, gadwall, common crow, field sparrow, and mockingbird.

CURRENT ESTIMATED POPULATIONS OF GAME SPECIES [a/]
LAKE VERRET WATERSHED

Species	Habitat Type	Acres	Number Per Acre(s)	Total In Watershed
Dove	Open Land	99,300	1/20	4,965
Quail	Open Land	99,300	1/25	3,972
Squirrel	Forest Land	125,500	1/2	62,750
Deer	Forest Land	125,500	1/20	6,275
Rabbit	Forest Land & Open Land	224,800	1/3	74,933
Woodcock	Forest Land	125,500	1/10	12,550
Resident Waterfowl	Forest Land & Lakes	126,030	1/50	2,521
Migratory Waterfowl	Forest Land & Lakes	126,030	1/15	8,402
Turkey [b/]				
Black Bear [c/]				

[a/] Data developed in cooperation with Louisiana Wild Life and Fisheries Commission.

[b/] Turkeys were stocked in 1970 and 1071. The Commission allowed hunting of turkeys in 1977 in portions of the watershed area. population data is not yet available.

[c/] Population data not available.

3. Reptiles - Western cottonmouth, Southern copperhead, canebrake rattlesnake, speckled kingsnake, gray rat snake, diamond-backed water snake, glossy water snake, green water snake, yellow bellied water snake, Eastern garter snake, Western mud snake, broad-banded water snake, red-eared turtle, common snapping turtle, ground skink, and Southern fence lizard.

4. Amphibians - Bullfrog, three-toed amphiuma, Central newt, green treefrog, Fowler's toad, Southern leopard frog, bronze frog, dwarf salamander, Central dusky salamander, northern spring peeper, and southern cricket frog.

Utilization of the wildlife resources is high, During the 1972-73 season, a total of 11,884 resident hunting licenses were sold in the parishes of Ascension, Assumption, and Iberville.[13/]

Fisheries

Fisheries within the watershed are moderate. Both sport and commercial fishing are very important to the economy of the area. Some of the more important bayous and lakes are Grand Bayou, Bayou Corne, Bayou Bijou, Bayou Grosbec, Bayou Tigre, Lake Natchez, unnamed natural lakes, numerous canals, borrow pits, and the outlet, Lake Verret. In addition, there are nine crawfish ponds totaling 270 acres on individual farms. Commercial fishermen also seek these crustaceans in the flooded swamps. Access to most of the water areas is sufficient.

A list of fish species found in the bayous and lakes in the project area is found on page 45. Three rotenone samples were taken in September 1973, by the Soil Conservation Service with assistance from the Louisiana Department of Wildlife and Fisheries. Locations of these samples were Lake Verret, Grand Bayou and Bayou Sigur. Results of these samples showed good populations of both game and commercial fish species in Lake Verret. Lake Verret had a much higher population of game fish than did Grand Bayou and Bayou Sigur. Samples from the bayous showed a high population of commercial species. Summaries of these samples are found on pages 46 through 48.

Rotenone samples were again taken in Lake Verret, Grand Bayou, and Bayou Sigur during August 1975. Results of these samples show that the standing crops for Lake Verret and Bayou Sigur had not changed greatly during the 2-year period. Grand Bayou had a standing crop of 307 pounds of fish in 1973. This total dropped to 126 pounds in 1975. Species diversity for Lake Verret was similar for 1973 and 1975. In comparison, Bayou Sigur and Grand Bayou sample data for 1975 showed a decrease in game fish.

The most suitable spawning and nursery habitats for game fishes in this area are the littoral regions of northern Lake Verret and the lower ends of Pierre Pass, Grand Bayou and Little Grand Bayou. The characteristic floral community of these littoral regions consists of (1)

13/ Unpublished data, Louisiana Wild Life and Fisheries Commission.

LAKE VERRET WATERSHED

List of Fish Species Found in Project Area
From Rotenone and Electrofishing Samples

Common Name	Scientific Name
Largemouth bass	*Micropterus salmoides*
White crappie	*Pomoxis annularis*
Chain pickerel	*Esox niger*
Bluegill	*Lepomis macrochirus*
Green sunfish	*Lepomis cyanellus*
Warmouth	*Lepomis gulosus*
Flier	*Centrarchus macropterus*
Spotted sunfish	*Lepomis punctatus*
Longear sunfish	*Lepomis megalotis*
Redear sunfish	*Lepomis microlophus*
Channel catfish	*Ictalurus punctatus*
Blue catfish	*Ictalurus furcatus*
Yellow bullhead	*Ictalurus natalis*
Black bullhead	*Ictalurus melas*
Carp	*Cyprinus carpio*
Smallmouth buffalo	*Ictiobus bubalus*
Bowfin	*Amia calva*
Spotted gar	*Lepisosteus oculatus*
Freshwater drum	*Aplodinotus grunniens*
Gizzard shad	*Dorosoma cepedianum*
Striped mullet	*Mugil cephalus*
Mississippi silverside	*Menidia audens*
Hogchoker	*Trinectes maculatus*
Bigmouth buffalo	*Ictiobus cyprinellus*

Summary of Fish Population Data for Bayou Sigur
* One Acre Sample
September 1973

Species	Fish of Available Size: Minimum Length (inches)	Fish of Available Size: Number/ Acre	Fish of Available Size: Pounds/ Acre	Intermediate: Range in Length	Intermediate: Number/ Acre	Intermediate: Pounds/ Acre	Fingerlings: Maximum Length	Fingerlings: Number/ Acre	Fingerlings: Pounds/ Acre
PREDATORY GAME FISH									
Largemouth bass	9.0	1	1.3	--------	-	-	-	-	-
White crappie	7.0	3	1.0	--------	-	-	-	-	-
Total		4	2.3						
NON-PREDATORY GAME FISH									
Bluegill	5.0	2	.3	--------	1	T	-	-	T
Green sunfish		1	.3	--------	1		-	1	T
Total		3	.6		2	T		1	T
NON-PREDATORY FOOD FISH									
Carp	14	16	63.2	--------	1	1.3	-	-	-
Freshwater drum	10	1	1.0	--------	9	1.8	-	1	T
Yellow bullhead	7	10	7.0	--------	5	.7	-	-	-
Black bullhead	7	1	.4	--------	-	---	-	-	-
Total		28	71.6		15	3.8		1	T
PREDATORY FOOD FISH									
Channel catfish		T	3.9	--------	51	4.2	-	-	-
Blue catfish	-	7	3.2	--------	50	4.0	-	-	-
Spotted gar	-	-	-	--------	3	1.1	-	-	-
Total		7	7.1		104	9.3			
FORAGE FISH									
Shad	8	14	5.5	--------	33	3.4	-	15	.2
Mullet	12	2	2.3	--------	--	---	-	--	--
Total		16	7.8		33	3.4		15	.2
GRAND TOTAL		58	89.4		154	16.5		17	.2

* Standing Crop/acre = 106.1 lbs. Represents only the first day pickup.

Summary of Fish Population Data for Grand Bayou
One Acre Sample
September 1973

Species	Fish of Available Size: Minimum Length (inches)	Fish of Available Size: Number/ Acre	Fish of Available Size: Pounds/ Acre	Intermediate: Range in Length	Intermediate: Number/ Acre	Intermediate: Pounds/ Acre	Fingerlings: Maximum Length	Fingerlings: Number/ Acre	Fingerlings: Pounds/ Acre
PREDATORY GAME FISH									
Largemouth bass	9.0	1	1.3	5.0-8.9			4.9		
White crappie	7.0	8	2.8	5.0-6.9	4	.8	4.9	6	.2
Grass pickerel	7.0	-	---	5.0-6.9	1	.2	4.9	1	.1
Total		9	4.1		5	1.0		7	.3
NON-PREDATORY GAME FISH									
Bluegill	5.0	5	.7	3.0-4.9	1	T	2.9	4	T
Warmouth	5.0	4	.4	3.0-4.9	4	.1	2.9	2	T
Flier	5.0	2	---	3.0-4.9	2	T	2.9	1	T
Total		11	1.1		7	.1		7	T
NON-PREDATORY FOOD FISH									
Carp	14.0	2	7.3	7.0-13.9	2	2.5	6.9	-	-
Freshwater drum	10.0	2	.5	5.0- 9.9	2	.5	4.9	-	-
Yellow bullhead	7.0	7	5.1	5.0- 6.9	-	---	4.9	-	-
Total		11	12.9		4	3.0			
PREDATORY FOOD FISH									
Channel catfish	10.0	7	4.0	5.0- 9.9	10	1.9	4.9	-	-
Blue catfish	10.0	8	3.7	5.0- 9.9	37	3.2	4.9	-	-
Bowfin	14	13	46.7	5.0-13.9	3	2.1	4.9	-	-
Spotted gar	24	-	----	7.0-23.9	4	1.0	6.9	-	-
Total		28	54.4		54	8.2			
FORAGE FISH									
Gizzard shad	8.0	398	118.6	4.0- 7.9	945	93.3	3.9	517	10.0
Mullet	12.0	---	-----	5.0-11.9	---	----	4.9	---	----
Misc. Minnows							4.9	16	T
Total		398	118.6		945	93.3		533	10.0
GRAND TOTAL		457	191.1		1015	105.6		547	10.3

Standing Crop/acre = 307.0 lbs.

Summary of Fish Population Data for Lake Varret
One Acre Sample
September 1973

Species	Fish of Available Size: Minimum Length (inches)	Number/ Acre	Pounds/ Acre	Intermediate: Range in Length	Number/ Acre	Pounds/ Acre	Fingerlings: Maximum Length	Number/ Acre	Pounds/ Acre
PREDATORY GAME FISH									
Largemouth Bass	9.0	11	11.5	5.0-8.9	1	.3	4.9	-	-
White crappie	7.0	3	.6	5.0-6.9	3	.4	4.9	-	-
Total		14	12.1		4	.7			
NON-PREDATORY GAME FISH									
Bluegill	5.0	249	43.1	3.0-4.9	70	6.8	2.9	-	-
Redear sunfish	5.0	1	.4	3.0-4.9	-	-	2.9	-	-
Warmouth	5.0	24	3.3	3.0-4.9	2	.2	2.9	-	-
Spotted sunfish	5.0	4	1.0	3.0-4.9	6	.8	2.9	-	-
Longear sunfish	5.0	7	2.0	3.0-4.9	-	-	2.9	-	-
Flier	5.0	6	1.0	3.0-4.9	6	.8	2.9	-	-
Total		291	50.8		84	8.6			
NON-PREDATORY FOOD FISH									
Carp	14.0	1	1.6	7.0-13.9	1	1.0	6.9	-	-
Smallmouth buffalo	16.0	-	-	5.0-15.9	1	.4	4.9	-	-
Yellow bullhead	7.0	.7	3.2	5.0- 6.9	2	.2	4.9	-	-
Black bullhead	7.0	5	1.7	5.0- 6.9	4	.3	4.9	-	-
Total		6.7	6.5		8	1.9			
PREDATORY FOOD FISH									
Blue catfish	10.0	1	.5		4	.2	4.9	-	-
Total		1	.5		4	.2	4.9		
FORAGE FISH									
Gizzard shad	8.0	160	76.0	4.0- 7.9	8	.5	3.9	1	T
Mullet	12.0	5	8.0	5.0-11.9	-	-	4.9	-	-
Total		165	84.0		8	.5		1	T
GRAND TOTAL		477.7	153.9		108	11.9		1	T

Standing Crop/acre = 165.8 pounds

Summary of Fish Population Data for Grand Bayou
One Acre Sample
August 20, 21, 1975

Species	Fish of Available Sizes: Minimum Length (inches)	Number/ Acre	Pounds/ Acre	Intermediate: Range in Length	Number/ Acre	Pounds/ Acre	Fingerlings: Maximum Length	Number/ Acre	Pounds/ Acre
PREDATORY GAME FISH									
Black crappie	7.0			5.0-6.9			4.9	1	T
Total								1	T
NON-PREDATORY FOOD FISH									
Carp	14.0	21	67.6	7.0-13.9					
Black bullhead	7.0	20	17.3	5.0- 6.9	1	.2	4.9		
Total		41	84.9		1	.2			
PREDATORY FOOD FISH									
Spotted gar	24.0	1	2.25	7.0-23.9	3	2.75	6.9		
Bowfin	14.0	7	23.5	5.0-13.9			4.9	1	T
Total		8	25.75		3	2.75		1	T
FORAGE FISH									
Gizzard shad	8.0	50	11.6	4.0-7.9	13	1.0	3.9	1	T
Threadfin shad	-			4.0-5.9			3.9		
Golden shiners	6.0			4.0-5.9			3.9	12	.08
Miscellaneous minnows	-			4.0-5.9			3.9		
Miscellaneous darters	-			4.0-5.9			3.9		
Madtom	-			4.0-5.9			3.9		
Total		50	11.6		13	1.0		13	.08
GRAND TOTAL		99	122.25		17	3.95		15	.1

Standing Crop/acre = 126.3 pounds

Summary of Fish Population Data for Lake Verret
One Acre Sample
August 19, 20, 1975

Species	Fish of Available Size: Minimum Length (inches)	Number/ Acre	Pounds/ Acre	Intermediate: Range in Length	Number/ Acre	Pounds/ Acre	Fingerlings: Maximum Length	Number/ Acre	Pounds/ Acre
PREDATORY GAME FISH									
Largemouth bass	9.0	12	8.2	5.0-8.9			4.9		
White crappie	7.0	1	1.0	5.0-6.9			4.9		
Black crappie	7.0	3	1.4	5.0-6.9			4.9	2	T
Total		16	10.6					2	T
NON-PREDATORY GAME FISH									
Bluegill	5.0	265	43.4	3.0-4.9	1	T	2.9	1	T
Redear sunfish	5.0	1	.3	3.0-4.9			2.9		
Flier	5.0	2	.26	3.0-4.9			2.9		
Warmouth	5.0	10	2.0	3.0-4.9	1	T	2.9		
Total		278	45.96		2	T		1	T
NON-PREDATORY FOOD FISH									
Carp	14.0	5	23.3	7.0-13.9			6.9		
Drum	10.0	2	0.6	5.0- 9.9	1	0.1	4.9		
Bigmouth buffalo	16.0	1	4.7	5.0-15.9			4.9		
Yellow bullhead	7.0	3	1.1	5.0- 6.9			4.9		
Black bullhead	7.0	4	1.0	5.0- 6.9			4.9		
Total		15	30.7		1	0.1			
PREDATORY FOOD FISH									
Channel catfish	10.0	21	6.4	5.0- 9.9	28	3.4	4.9		
Blue catfish		6	7.4						
Spotted gar	24.0	4	10.4	7.0-23.9	4	6.4	6.9		
Total		31	24.2		32	9.8			
FORAGE FISH									
Gizzard shad	8.0	39	6.5	4.0- 7.9	140	14.3	3.9	25	.6
Threadfin shad	-			4.0- 5.9			3.9	23	.2
Miscellaneous minnows	-			4.0- 5.9			3.9	6	T
Striped mullet	10.0	13	6.1	4.0- 9.9	4	1.1	3.9		
Madtom	-			4.0- 5.9			3.9	1	T
Total		52	12.6		144	15.4		55	0.8
GRAND TOTAL		392	124.06		179	25.3		58	0.8

Standing Crop/acre = 150.16 pounds

Summary of Fish Population Data for Bayou Sigur
* One Acre Sample
August 21, 1975

Species	Fish of Available Size: Minimum Length (inches)	Number/ Acre	Pounds/ Acre	Intermediate: Range in Length	Number/ Acre	Pounds/ Acre	Fingerlings: Maximum Length	Number/ Acre	Pounds/ Acre
NON-PREDATORY FOOD FISH									
Carp	14.0	16	61.9	7.0-13.9	3	1.5	6.9		
Yellow bullhead	7.0	2	.6	5.0- 6.9	1	0.1	4.9	1	0.1
Total		18	62.5		4	1.6		1	0.1
PREDATORY FOOD FISH									
Channel catfish	10.0	10	6.3	5.0- 9.9	19	3.5	4.9		
Spotted gar	24.0	1	3.0	7.0-23.9	4	6.1	6.9		
Total		11	9.3		23	9.6			
FORAGE FISH									
Gizzard shad	8.0	23	7.4	4.0- 7.9	356	20.6	3.9		
Total		23	7.4		356	20.6			
GRAND TOTAL		52	79.2		383	31.8		1	0.1

Standing Crop/acre = 111.1 pounds represents only the first day pickup

rooted submersed aquatics - coontail (Ceratophyllum demersum), elodea (Egeria densa), fanwort (Cabomba caroliniana); (2) rooted aquatics with floating leaves - American lotus (Nelumbo lutea); and (3) floating aquatics - water lettuce (Pistia stratioties), waterhyacinth (Eichornia crassipes), and the duckweeds (Lemnaceae). The important game fishes of this area are the Centrarchidae (sunfishes, black bass, crappies) and to a lesser degree the Esocidae (pickerels) and the Percichthyidae (yellow bass, white bass).

The Louisiana Wild Life and Fisheries Commission opened Lake Verret for 31 days in March 1968 for gill and trammel nets. Thirty-eight permits were given to 18 fishermen from Assumption Parish and to 19 fishermen from St. Mary Parish. The total reported catch was 205,249 pounds of commercial fish for an estimated value of $30,787. Another season for commercial fishermen was opened on Lake Verret in the spring of 1976. Use of all the fisheries is high. During the 1972-73 season, resident fishing license sales totaled 14,066 in the parishes of Assumption, Ascension, and Iberville.[14/] There is also some crawfishing activity in the swamps during the spring season.

Threatened and Endangered Species

The following animal species are found on the "United States List of Endangered Fauna," issued May 1974 (revised periodically in the Federal Register), by the U.S. Department of the Interior. These animals could, or actually do, occur in or adjacent to the Lake Verret Watershed. Listed are the brown pelican, the Southern bald eagle, the American peregrine falcon, the ivory-billed woodpecker, and the Bachman's warbler. The brown pelican, usually a coastal bird, has been recorded in the past on inland lakes as far north as Caddo Lake and Lake Bistineau.[15/] Individual pelicans might occasionally fly inland to Lake Verret. In 1975-76, there were several known nesting sites of the Southern bald eagle in Louisiana.[16/] One recent nest was located just outside the watershed boundary. The majority of active nests are located between Morgan City and New Orleans. Lake Verret serves as a feeding area for some of these birds. The peregrine falcon, an uncommon winter resident in Louisiana, is most often seen near the coast. It has been observed at inland localities and may occasionally be seen around Lake Verret. The American ivory-billed woodpecker may be extinct. Recent rumors[17/] of the occurrence of the ivory-billed woodpecker in the Atchafalaya Basin have not been confirmed. Project area forests could

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14/ Ibid.

15/ Oberholsen, H.C. The Bird Life of Louisiana. Louisiana Department of Conservation. New Orleans, 1938.

16/ Duffy, M. The Bald Eagle, Louisiana Conservationist 28 (334), 1976.

17/ Nevin, D. The Irresistable, Elusive Allure of the Ivory-bill, Smithsonian 4(11). 1974.

possibly serve as habitat for these birds. Bachman's warbler, a very elusive bird, has been observed on only a few occasions since its discovery in 1833. This warbler, an inhabitant of wooded swamps, may occur in the swamps of the Lake Verret Watershed. The American alligator, a threatened species, occurs in the project area.

Recreation Resources

A 1974 inventory conducted by the State Parks and Recreation Commission listed 78 recreational sites for Ascension, Assumption, and Iberville Parishes. According to the Bureau of Outdoor Recreation's land classes, 71 of these are general recreational, 5 are primitive historic and cultural, and 2 are natural environmental. These sites total 40,372 acres, with 1,257 acres in water. About 39,350 acres are in organized hunting clubs, including 36 boat ramps. Twenty of these sites are in the watershed covering 38,271 acres, of which 38,200 acres are in hunting clubs. There exists on the other 71 acres several boat ramps, a camp, a golf course, two parks, a lodge, and two old tourist homes. Bank fishing, float fishing, frogging, boating, and swimming occur on Pierre Bay, Lake Natchez, Grand Bayou, Choctaw Bayou, and Lake Verret. Most open water areas are fished by sportsmen. Several other bayous and channels are used extensively as multiple-purpose resources.

Archaeological, Historical, Scientific, and Unique Scenic Resources

Both the Curator of Anthropology, Louisiana State University, and the Office of the Louisiana State Historic Preservation Officer were consulted in documenting the recorded and registered historical and archaeological sites within the watershed. The resulting archival search and review of the National Register of Historic Places revealed 17 recorded archaelogical sites, 1 National Register Site, and 1 location nominated to the National Register.

The Soil Conservation Service entered into an agreement with Louisiana State University to identify cultural resources within the watershed and to assess the impact of planned structural measures on these resources. The 17 recorded archaeological sites are mostly shell middens and shell and earthen mounds. Many of these deposits were first reported in the 1930's and have not been professionally inspected since then. The surface expression of some of these sites has long since been erased due to cultural and/or natural forces. The Bayou Plaquemine Lock located in Plaquemine, Louisiana, is currently on the National Register of Historic Places. The Saint Louis Plantation in Iberville Parish, just south of the City of Plaquemine, has been nominated to the National Register.

A detailed field survey of areas to be disturbed by the installation of structural measures was conducted by the Curator of Anthropology between November 1, 1975 and January 25, 1976. No new sites were discovered as a result of this survey. A letter from the State Historic Preservation Office concurring in the survey is on file in the SCS office.

No unique scenic or scientific resources of national significance other than geodetic control survey monuments have been identified within the watershed. Areas with local and regional significance exist. Numerous areas and sites of historic and/or scenic interest are inventoried in a published appraisal of potential for outdoor recreational development. The referenced appraisal was prepared by the Louisiana Parish Rural Development Committees and the Capital Resource Conservation and Development Project in Louisiana. Cooperation with the U.S. Department of Agriculture and State agencies aided this appraisal which was published in June 1973.

There are no recorded scenic rivers or streams within the watershed.

Soil, Water and Plant Management Status

The early settlers of the area planted corn, rice, indigo, cotton, and sugarcane. Cotton was the first major crop. However, sugarcane became the major crop after 1794, and remains so today. Mill quotas on cane processing have stabilized acreage to the extent that only 15,000 acres have been added in over 30 years.

Soybean acreage has been increasing at a slow rate, from about 200 in 1960 to 20,400 in 1970 within the three parishes. This increase has caused some reduction in forest land and pastureland. Between 1950 and 1975, about 14,200 acres of forest land was cleared in Ascension, Assumption, and Iberville Parishes. During a 10-year period (1965-1975), an estimated 1,800 acres of forest land was cleared in the watershed.

Cropland is expected to decrease about 5,000 acres because of industrial expansion. Pastureland makes up 4 percent of the watershed. This is expected to decrease slightly in the future. "Other land" will increase about 9,700 acres. Large-scale industrial development on about 8,300 acres is expected. Urban and built-up will increse about 100 acres. The remaining 1,300 acres will be onfarm miscellaneous uses.

The watershed is in the Lower Delta Soil and Water Conservation District. There are 402 operating units covering 130,368 acres which have basic soil and water conservation plans. Twenty-five other farms with 35,966 acres have received assistance from the district. These farms represent about 68 percent of the area. About 9 percent of the needed conservation measures have been applied with district assistance within the 10-year period prior to the watershed becoming operational. This cost the farmers about $1,318,800 and was applied on problem and nonproblem areas. Since the watershed became operational, the landusers have installed about 49 percent of the planned land treatment measures costing about $1,227,600.

The Soil Conservation Service district conservationists work closely with the soil and water conservation district in establishing work priorities. Various methods, including radio, television, and newsletters are used to promote sound conservation in the area.

Two clerks and two aids are employed by the district to assist Soil Conservation Service field office personnel with the overall conservation program.

The Louisiana Forestry Commission, through the various Federal-State Cooperative Programs, is providing forest management assistance, forest fire protection and suppression, distribution of planting stock, and forest pest control assistance to private landowners and operators in the watershed.

The forest land, other than that in industrial ownership, is in a relatively unmanaged condition mainly due to wet conditions and lack of access into forested areas. When an area is logged, costs and difficulty require that the majority of merchantable material be removed to make the operation economically feasible.

<u>Projects of Other Agencies</u>

A continuous levee system constructed by the U.S. Army Crops of Engineers along the Mississippi River extends through Louisiana and provides protection from flooding when the river is at high stage. A portion of this levee forms the northeastern boundary of the watershed. The area is also protected from river flooding by the East Atchafalaya Basin Protection Levee.

Before construction of the mainline Mississippi River levee system, a portion of the flood flow each year was carried by Bayou Lafourche. With the installation of the levee system, this old bayou was blocked from the Mississippi River. The Bayou Lafourche Freshwater District, with the technical assistance of the Louisiana Office of Public Works, has constructed a pumping plant which takes water from the Mississippi River and releases it down Bayou Lafourche. This process causes an otherwise stagnant stream to have a continuous flow. Subdistricts claim this water, treat it, and deliver it to residents along and adjacent to this bayou.

The U.S. Army Corps of Engineers levee along the Mississippi River and the Bayou Lafourche Freshwater District pumping plant at Donaldsonville enhance the value of this plan. Neither the work plan proposals nor these projects by other agencies will adversely affect the other. There is no interchange of water between Bayou Lafourche and any channel proposed by this plan.

In 1974, the U.S. Army Corps of Engineers initiated a study of flood problems in the area between the East Atchafalaya Basin Protection Levee and the Mississippi River and Bayou Lafourche from Morganza, Louisiana to the Gulf of Mexico. Some of this area experienced severe flooding in 1973. The Lake Verret watershed is located in the central and southcentral portion of this study area. This study does not conflict with any planned measures of the Lake Verret Watershed.

SETTING

A comprehensive multi-purpose plan for the Atchafalaya Basin Floodway Project is currently being developed by the U.S. Army Corps of Engineers. Study efforts in the area affected by the proposed Lake Verret Watershed project are limited to investigations of backwater flooding in the area east of the Atchafalaya Basin Floodway, and to the investigation of measures for the diversion of flows to the area from the Atchafalaya Basin Floodway for fish and wildlife, recreation, and other purposes. The proposed watershed project would not foreclose any options for accomplishing these purposes.

The U.S. Army Corps of Engineers is conducting a study of the New Orleans-Baton Rouge metropolitan area. The purpose of the study is to provide a plan for development, utilization, and conservation of water and related land resources in that region.

The Atchafalaya River and Bayous Chene, Boeuf, and Black navigation projects will provide a waterway to afford transportation for large offshore drilling equipment being built by industries in the area and for personnel and equipment serving offshore drilling operations. Construction is complete on the bay and Gulf reaches. Plans and specifications for the reach from Black Bayou to Bayou Chene are completed. Also an Environmental Impact Statement has been prepared.

The planned hydraulic functioning of the Lake Verret Watershed project does not depend on the above-mentioned navigation project.

The Department of Transportation and Development, Office of Public Works, in cooperation with local organizations, has installed a partial system of channels for disposal of excess rainfall and for improvement of drainage within the planned project area. Due to subsequent changes in land use and normal deterioration, many of these channels are no longer adequate to provide the eisired level of protection.

The State of Louisiana, Department of Culture, Recreation, and Tourism has developed a State Parks Master Plan. Acquisition and development of a 1,000-acre park on Lake Verret is proposed for the "Future" phase of the plan. Major development costs are projected at $4,300,000. Anticipated outdoor recreation activities include such water-based activities as swimming, motor-boating, and fishing.

WATER AND RELATED LAND RESOURCE PROBLEMS

Land and Water Management

Resource conservation has been accepted by many of the land users in the watershed. However, because of inadequate drainage outlets, they have been reluctant to install many of the needed conservation land treatment measures.

The principal problems in the watershed stem from flooding and inadequate drainage. Approximately 60 percent and 40 percent of the agricultural soils have a slight and moderate wetness hazard, respectively. Although the soils do not have a severe wetness hazard, extensive surface drainage systems are needed. The present slow rate of surface water movement from the soils delay panting, delay application of necessary cultural practices, and delay timely harvesting of mature crops in the fall (see picture on page 55). When harvesting of the principal crop, sugarcane, is delayed until the freezing season begins, considerable damage and loss through spoilage occur.

Much of the pastureland has been invaded by noxious species of plants. These species create problems in that they take plant nutrients from the soil that could be used by more desirable plants.

The soils are high in natural fertility, and crops respond well to recommended fertilizers.

The forested area of the watershed consists of 125,500 acres. One hundred thousand and five hundred acres of this forest land is subject to prolonged or seasonal flooding and wet conditions. These wet conditions apparently do not affect the growth of the stands. However, regeneration is adversely affected, and logging is very difficult. The remaining 25,000 acres of forest land is frequently flooded, but the flood duration is short because of its higher elevation.

In view of the number, size, and per capita income of operating units, most landusers have the necessary capital requirements for installing conservation land treatment measures. The lag in the rate of application on these lands is due mainly to inadequate outlets. Once this problem is solved, the landuser will be able to install the needed land treatment measures.

Floodwater Damages and Drainage Problems

Floodwater damages and drainage problems are inseparable on about 54,300 acres of agricultural land which includes 47,000 acres of sugarcane, 3,300 acres of soybeans, and 4,000 acres of pastureland. Flooding from storm runoff prolongs wet soil conditions in the nearly level terrain. (Drainage is defined as the conveyance of excess water from agricultural lands, whereas flood prevention is defined as the elimination or reduction of the depth and areal extent of flooding.) Chan-

Sugarcane Being Harvested

nels in the problem areas are not adequate to prevent frequent, direct damages from flooding or to allow onfarm drainage systems to function properly.

To provide the required degree of drainage and flood prevention, a comprehensive system of channels is needed. This system will provide adequate outlets for onfarm and group drainage systems and allow a higher rate of removal from intensively developed areas. The Sponsors have expressed a desire to install structural measures in such a way that damages to existing wildlife and fisheries will be minimized.

Rainfall of at least 3.6 inches in a 48-hour period occurs on an average of two times a year, 5.0 inches once a year, and 6.4 inches, once in 2 years. Total damages caused by floods with average recurrence intervals not exceeding 2 years are greater that the total damages caused by larger but less frequent floods. Damaging out-of-bank flows in portions of the area occur about two times yearly. Good drainage and flood prevention is essential throughout the year for normal crop production.

Prolonged wetness due to inadequate outlets cause farm operators to delay planting and to use additional cultural practices in production and additional equipment and labor in harvesting. The quality and quantity of sugarcane and soybeans are adversely affected when normal harvesting is delayed.

Land use changes from noncropland to cropland have occurred at a slow rate. An estimated 1,800 acres of forest land were cleared in the watershed during the 10 years between 1965 and 1975.

Sugarcane will be used to illustrate flooding problems in the watershed. It is the main cash crop, and most other farm enterprises are planned around its production. Sugarcane production is a continuous cycle of planting and harvesting with multi-harvests resulting from one planting. This crop is unique in that adverse conditions that affect it when planted could affect the yields obtained in following years. The most important factor contributing to a better stand of sugarcane is adequate drainage.

A new crop of sugarcane is started in the late summer or fall. The plant cane, or seed cane, is place lengthwise at about a 4-inch depth in an 18-inch high row. Under good drainage conditions, this cane will sprout, producing a shoot that will depend upon the plant cane for nourishment until it grows roots of its own. When a killing frost occurs, the above ground growth that has taken place since the cane was planted is killed. The cane then goes into a dormant state for the duration of the winter. When the growing season (spring) begins the cane will again sprout and begin to grow until it reaches maturity. At this time, the cane is harvested. The stubble is left to provide the crop for the next year and the year after. With this type of crop, prolonged wetness any time during the year can be very harmful. If

extreme wetness occurs during the fall and winter, much of the cane will not survive until spring. Prolonged wetness slows root growth, forcing the new plant to feed totally on the seed cane. Once the nourishment stored in this seed cane is used up the new plant dies. This reduces the plant population, causing reductions in expected yields long before the crop is ready for harvesting.

If the wet periods occur in the summer, the plants have a better chance of surviving, because they have grown considerably since spring began. However, there still exists the real danger of loss due to wetness. This loss occurs when the soil, weakened by sustained wetness, cannot support the plant. The weight of the plant causes it to fall.

Reduced quality and increased cost during harvesting is another major problem that is directly due to wetness. Sugarcane is a crop that is highly perishable. When it is time to harvest, sugarcane must be cut and carried to the mill for processing before rapid loss in sucrose content occurs. When the sucrose content is below standard, the farmer loses a large amount of money. Each farmer has a quota of cane that he must carry to the mill each day. He must carry his allotted amount regardless of the conditions of his fields. When the fields are wet, more labor, equipment, and time are required to harvest the crop. This increases the farmer's cost of production. Quality is also reduced in this situation, because excessive amounts of trash and mud also go to the mill.

Harvesting under wet conditions continues to cost the farmer money after the harvest has been completed. All the fields harvested when wet need post-harvest preparation to get them into a desirable condition.

The farmers in this watershed average about 20 tons of cane per acre. However, research has shown that proper water management (removing surplus water during periods of high rainfall and supplying water during droughts) can extend one planting of cane into three, and possibly four and five harvests at better than 40 tons per acre per year.

The production of sugarcane, as well as the national demand for sugar, is an important factor to farmers within the watershed. National consumption of sugar is provided by 53 percent being produced domestically and 47 percent coming from outside the country. Acreage suited for the production of sugar is limited, both for sugar beets and sugarcane. "The per capita refined sugar consumption in 1975 was less than 90 pounds, down from 97 pounds in 1974 and the lowest in three decades. The 1975 decline has been attributed to consumer resistance to high prices for sugar and products containing sugar."[1/] The average per capita consumption of sugar is relatively constant. The continuing increase in population, along with the limited land suited for sugar production, will maintain an increasing demand for sugar. The increased

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1/ The National Food Situation, February 1976, Economic Research Service, USDA.

production that can be brought about by flood prevention and drainage, will help maximize production within the watershed and provide some of the increasing domestic demands.

Urban and agricultural flooding is a problem in the western portion of the Donaldsonville area. A 100-year flood in this area would inundate about 50 percent of the land and damage 38 homes. Several homes, residential yards and streets in the area were damaged during a recent large storm, as pictured on page 59. Many of the above mentioned properties are subject to lesser damages from smaller storms.

In addition to the direct and indirect monetary damages identified, other adverse conditions exist as a result of flooding and poor internal drainage. These include: (1) health hazards caused by water standing in yards and under houses, (2) undesirable odors from stagnated water around dwellings, and (3) wading in water to get to and from dwellings. All these conditions affect the quality of life and social well-being of the residents.

Average annual floodwater damages are $897,400. Of this amount, $775,000 are crop and pasture damages, $40,800 are residential damages, and $81,600 are indirect damages. Crop and pasture losses due to poor drainage total $582,800.

Erosion Damages

Three factors prevent erosion from being a major problem in the watershed: (1) deep soils, (2) retention of eroded material in the fields, and (3) nearly level slopes of the land.

Sheet erosion is the principal form of erosion and amounts to approximately 4.17 tons per acre per year or 1,026,000 tons per year over the watershed. The other appreciable form of erosion is gully erosion which amounts to approximately 460,000 tons per year. These figures reflect the present land use and the present state of land treatment. Without the project, sheet erosion will be reduced to 1,004,000 tons per year due to the "ongoing" land treatment program. Gully erosion will remain at about the same rate as present.

Sediment Damages

The pattern of sediment deposition, which in itself is a major problem, serves to reduce the severity of the problems caused by erosion. About 903,000 tons of sediment per year is deposited in the split ditch system. This is approximately 72 percent of the sediment derived from sugarcane fields, which requires an annual cleanout of these ditches. The material is put back on the field from which it was eroded. About 16 percent of the eroded material is being deposited in the upper reaches of mains and laterals. Approximately 58,000 tons per year is being deposited in Grand Bayou and the swamp east of Grand Bayou, north of State Highway 70. About 20,000 tons of sediment per

Urban flooding over-floor in residence in Donaldsonville, Louisiana

Street and home flooding in Donaldsonville, Louisiana

year is being delivered to Lake Verret. Sediment delivered to Lake Verret weighs approximately 50 pounds per cubic foot. This 20,000 tons of sediment per year amounts to a volume of about 19 acre-feet per year. This may be compared to an approximate volume of Lake Verret of 70,400 acre-feet.

Irrigation Problems

Very little irrigation is done within the watershed. Surface water supplies the small amount of water used. This is not considered a problem.

Municipal and Industrial Problems

Water for municipal and industrial use was a problem at one time, but the Office of Public Works built a pumping plant at Donaldsonville. The pump uses Bayou Lafourche as a transmission system and the Mississippi River as a water source. The capacity of the pumping plant is large enough for present and projected demands for the area it serves within the watershed.

Recreational Problems

Local interest exists for developing recreational facilities to overcome the need within the watershed area. Existing recreational facilities within a 50-mile radius do not meet the demands of the public. Numerous waterways are suitable for development of additional water-based recreational activities.

The 1970 population within a 50-mile radius of the watershed, including the Baton Rouge Metropolitan Area, is about 801,000; 713,123 are five years of age and over, the age group defined by the Louisiana Statewide Comprehensive Outdoor Recreation Plan as the recreating public. Projections to the year 2020 show that the population will be 1,482,000, representing an 85-percent increase in a 50-year period. The recreational demands based on the present population, five years of age and over, are 8,073 tent camping sites, 7,804 trailer camping sites; 9,172 picnicking tables; and 1,489 boat launching ramps. Subtracting the present supply from present demands indicates a remaining need for 7,976 tent camping sites, 7,169 trailer camping sites, 7,283 picnicking tables, and 1,373 boat launching ramps.

The swamp area with its numerous watercourses flowing into Lake Verret is a substantial water-based recreation resource within the watershed. Limited access and facilities are problems. Within 50 miles numerous, but limited, resources and facilities for waterbased recreation are available. These resources include the Mississippi River, the lower Atchafalaya River Floodway, the Gulf of Mexico, Lake Palourde, Lake Maurepas, Lake Pontchartrain, and False River.

Plant and Animal Resource Problems

The main problem limiting open land wildlife species is lack of adequate cover and habitat. Cultural practices associated with sugarcane production are not conducive to most species using this habitat type. Very few food and cover plants are available, especially following harvest, when the sugarcane fields are broad, open expanses with insufficient food and cover to support high wildlife populations.

Turbid waters in bayous and ponded water channels adjacent to cultivated areas are limiting the fisheries. Game fish populations are kept low because of this limiting factor in these areas. Waterhyacinths completely cover the water in some bayous. This limits boat traffic and fishing in these areas.

Access to a large percentage of the forest land is limited to boats by way of the bayous and canals. More boat launching facilities at road crossings would increase use of the fisheries.

Water Quality Problems

Considering the entire project area and usage, water quality is rated good. In certain localized areas, problems do exist. Discharges of wastes from sugar mills is a localized problem. Such wastes increase the biochemical oxygen demand and place stress on the aquatic system.

Low dissolved oxygen readings occurred at Station No. 4 in November 1974, and low readings at all five sample stations occurred in August 1975. Turbidity was fairly high (355 ppm, 320 ppm) at sample Station Nos. 4 and 5 in November 1975. Phosphate (ortho) levels have been high (3.2 ppm, 20.0 ppm) at Station No. 5 during two sample periods. Ammonia nitrogen was high (7 ppm) at Station No. 5 in August 1975. The detailed sample data for various parameters can be seen in appendix H. The Environmental Protection Agency's Eutrophication Survey conducted in 1974 showed good water quality in Lake Verret for the current uses being made of that water body. Results of the eutrophication survey are found in appendix K. The U.S. Geological Survey sampled various water quality parameters in Lake Verret, Grassy Lake, and Lake Palourde. Data from these samples indicated a much higher fecal coliform and streptococci bacteria concentration in Lake Palourde (southwest corner) compared to Lake Verret and Grassy Lake. However, the inconclusive nature of one sample should be noted in this analysis. The USGS data is found in tabular form on page H-1 of appendix H.

Vector Problems

Any species which transmit disease organisms to another species is considered a vector. Insects are the most common widespread, and important vectors in the project area and include groups such as mosquitoes, houseflies, deerflies, horseflies, and midges. Abundant population levels and high species diversity of these insects, together

with plentiful supply of suitable habitat presents a considerable potential for vector problems in the area. The mosquito is the most important vector in the area and the diverse habitat support a large variety of species. The most common vector-borne diseases are swamp fever, dog heartworms, anaplasmoses, and both St. Louis and Venezuelan equine encephalitis. Other vectors in the project area of lesser importance as a source of disease transmittal are ticks, fleas, rats, bats, and fox. Since vector control is not a purpose of this project, no specific plans are included for their control.

Economic and Social

The economic and social problems of the watershed are directly related to the following:

1. Poverty
2. Unemployment
3. Welfare
4. Education
5. Out-migration
6. Reduced net returns per acre from farm land.

The level of income necessary for surviving on a minimum diet with none of the extras from wealth has been determined by the Social Security Administration. An individual is considered poor if his personal income or the income of his family does not provide for his subsistence. In 1960, by this definition, 52 percent of all the families in the watershed area were classified as poor; 41.1 percent of this total were white and 58.9 percent were nonwhite.[2/]

In 1966, 40 percent were classified as poor. This was an improvement of 12 percent since 1960. Only 0.9 percent of the families in the State of Louisiana lived in Iberville Parish in 1966. However, 1.2 percent of all the poor families in the State live in this parish. Thus, the watershed has a greater than proportionate share of poor families.[3/]

Since the largest part of the watershed is located in Iberville Parish, and since Assumption and Ascension Parishes are somewhat similar, the parish data for Iberville is used to represent the watershed.

The following tabulation shows the number of families, median income, and percent of families below poverty level for Iberville

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[2/] James R. Bobo and Dean A. Dudley, Statistical Abstract of Louisiana (4th ed. New Orleans: Division of Business and Economic Research, College of Business Administration, Louisiana State University at New Orleans, 1971), p. 192.

[3/] Ibid., p. 192.

Parish. These factors are broken down by rural farms, rural nonfarms, and urban areas for the year 1969.4/

Type of Families	Number of Families	Median Income	Percent of Families Below Poverty Level
Rural Farm	336	$5,645	30.1
Rural Nonfarm	4,067	$4,473	34.4
Urban	5,944	$6,605	19.9
Parish Total	10,347	$4,968	25.9

Iberville Parish economic conditions, based on factors of poverty, were below the State average in 1970. The factors used to determine these conditions were (1) primary individuals 65 years of age or over, (2) households having 1.51 or more persons per room, and (3) households lacking some or all plumbing facilities.5/

The population of Iberville Parish increased by 807 persons from 1960 to 1970. However, there was a 12-percent decrease in the expected 1970 population. The expected 1970 population was calculated by adding births from 1960 to 1970 to the 1960 population and then subtracting deaths which occurred during the same period.6/

Many young adults are leaving the farm to seek employment elsewhere. Increased efficiency of remaining labor through greater mechanization is necessary for many of the family farms to remain economically workable.

Old age assistance and aid to dependent children are the two major types of welfare aid in Iberville Parish.7/ Of the total public welfare assistance grants for Iberville Parish ($2,124,040) made in Fiscal Year 1971-72, 57 percent was for old age assistance; 31 percent was for aid

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4/ U.S. Department of Commerce, Bureau of Census, Census of Population: 1960, General Population Characteristics, Final Report PC (1)-B20, Louisiana. Washington: U.S. Government Printing Office, 1961.

5/ Fred W. Wrighton and Barbara H. Denton, "Population and Housing Correlates of Poverty in Louisiana, 1970, "The Louisiana Economy (Ruston: College of Business Administration, Division of Business and Economic Research, Louisiana Tech University, 1971), Vol IV, No. 2 (May 1972), p. 3.

6/ Ibid., Net Migration, Vol V, No. 1 (August 1972), p. 3.

7/ Bobo; op.cit., p. 103.

to dependent children; 8 percent was for disability assistance; and 4 percent was for general assistance and aid to the needy blind.[8/]

Information from the 1970 census shows that 8 percent of the people 25 years of age and older never completed 1 year of school, and 16 percent were high school graduates. The median years of school completed was 7.

According to the 1969 Census of Agriculture, there were 286 farms in Iberville Parish. This was a decrease of about 20 percent in number of farms from 1964 to 1969. The average size farm was 428 acres in 1969, as compared to 343 in 1964. In 1969, 22 percent of the farms were less than 50 acres, and 40 percent were less than 100 acres. Farm units in the watershed are continually decreasing in number and increasing in size.

Projections show that the trend of decreasing number of farms and increasing size of farms will continue in the future. Farmers are trying to raise their income and make up for low net returns per acre by farming more acres. To do this, they have to use large, more expensive labor-saving equipment.

The increasing cost of production inputs and unstable prices received for agricultural products has caused net returns per acre to decrease. Decreased net returns per acre have caused the small farm operator to leave the farm, expand his enterprises, or seek employment elsewhere using farm returns as supplementary income. From 1950 to 1970, the number of farm operators has decreased by 27 percent. The average size of farms has increased by approximately 25 percent [9/]. Many small farmers have either sold or rented their land. The majority of the remaining small farmers are employed off the farm and are not primarily dependent on the farm for their livelihood. According to the 1969 Census of Agriculture data, about 36 percent of the farms in the parish had sales of less than $2,500, about 48 percent had sales of less than $5,000, and about 59 percent had sales less than $10,000.[10/]

[8/] James R. Bobo and Jesse M. Carlton, Jr., Statistical Abstract of Louisiana (5th Ed.: New Orleans: Division of Business and Economic Research, College of Business Administration, University of New Orleans, 1974), p. 95.

[9/] U.S. Department of Commerce, Bureau of the Census, Census of Agriculture: 1970, Louisiana County Data, Final Report, Volume 1, Louisiana. (Washington: U.S. Government Printing Office, 1972), p. 193.

[10/] Ibid., p. 194.

RELATIONSHIP TO LAND USE PLANS, POLICIES, AND CONTROLS

None of the proposed works included in this statement will conflict with any plans, policies, or controls that are set forth in the Clean Air Act or the Federal Water Pollution Control Act Amendments of 1972.

Most Federal, State, and local land use plans in the watershed area are directed toward continued agricultural production. There are no known land use plans by the State or Federal Government that would interfere with implementation of the proposed project.

The Corps of Engineers, Department of the Army, has the responsibility for regulating disposal of dredged or fill material in waters of the United States, including wetland areas, as defined in the permit regulations of the Corps of Engineers (33 CFR 320 through 329). Permits must be obtained for such disposal, pursuant to the rules and regulations of the regulatory program, as published on July 19, 1977, in the "Federal Register" 42(138), pages 37,122 through 37,164.

ENVIRONMENTAL IMPACTS

Conservation Land Treatment

The installation of the remaining land treatment program will result in the adequate treatment of 46,500 acres of cropland. In addition, as part of their conservation plan, individual landusers in the watershed will retain or manage 8,700 acres of forest land for upland and wetland wildlife habitat. The remaining forest land will continue to receive forest management assistance, forest fire protection and suppression, distribution of planting stock, and forest pest control assistance through the going cooperative forestry program.

The installation of complete onfarm drainage systems on cropland and pastureland will result in the removal of excess surface water and permit the more clayey soils to dry more quickly. This will allow a more timely performance of cultural practices for planting, growing, and harvesting of crops on cropland and for seeding, fertilizing, mowing, and grazing of pastureland.

The application of conservation cropping systems and crop residue management on cropland will allow for (1) reducing soil loss, (2) providing needed organic matter to maintain soil fertility, and (3) maintaining high levels of weed control.

Structural Measures

Flood Prevention and Drainage - The effects of flood prevention and drainage are discussed together because the effects are related, and the problems of achieving adequate flood prevention and drainage are inseparable. Channels that remove floodwater also serve as outlets for drainage systems.

Excavation and clearing of project channels will cause decreased stages and shorter durations of flooding in benefited areas, and minor increases in stages immediately downstream from benefited areas (see page 70). Approximately 55,300 acres of cropland and pastureland will be benefited directly by the combined land treatment and construction programs. Although no benefits were claimed on the remaining 39,200 acres of cropland and pastureland, they will benefit from the project program of accelerated installation of land treatment measures and from crop rotation systems that will become possible because of direct project effects in adjacent benefited areas.

Approximately 48,100 acres of sugarcane, 3,300 acres of soybeans, and 3,900 acres of pastureland will be directly benefited. These acreages include 2,100 acres that are expected to be converted from forest on the basis of the present clearing trend and 1,200 acres expected to be converted from forest land because of project effects. Average yields in the benefited areas are expected to increase 15 percent for sugarcane, 36 percent for soybeans, and 40 percent for pastureland.

IMPACTS

Work on Channels L-6A3, L-6A3D, L-6A3E, and L-6A3F will minimize flood damages that are affected by these channels in the urban area of Donaldsonville. The 100-year storm and smaller storms will not flood over the floors of approximately 38 houses that would be flooded by the 100-year storm with present conditions. The physical effect of channel work will enhance the value of approximately 450 acres of land in the vicinity of Donaldsonville including 100 acres of forest land expected to be cleared due to project effects.

Most of the forest land remaining after the expected clearing occurs will continue to flood more often and drain slower than any land in the benefited areas. Each project channel was designed only for the purpose of providing increased flood protection and drainage in open agricultural land or in residential or commercial areas. Wherever forest land will be affected by project channels, the effect will be incidental to providing adequate flood protection and drainage in open land.

The potential effects of channel work will motivate landusers and operators to apply needed conservation practices. They will construct and maintain adequate onfarm and group drainage facilities, which will allow effective application of other needed land treatment measures. The land will be adequately treated and expected project benefits will accrue. The land treatment will improve the quality of downstream waters by reducing the downstream rate of movement of sediment and those agrichemical residues that attach to sediment particles.

An estimated 160 farmers will benefit directly from the project programs of accelerated land treatment and structural measures. These measures will benefit approximately 480 farm family members and farm employees, as well as other persons depending on agriculture for income. Financial and technical assistance for installing project measures will bring in money from increased use of local materials, services, and labor. Installation and maintenance of project measures may require use of presently unemployed or underemployed local labor.

Approximately 52,000 acres will be adequately treated following application of the accelerated land treatment program. The remaining cropland and pastureland will have some conservation measures applied on them.

The present land use, and the expected future land use, with and without the project, are shown in the following tabulation:

Land Use	Present	Future	
		Without Project	With Project
Cropland	90,200	84,500	85,165
Pastureland	9,100	8,400	8,351
Forest Land	125,500	123,000	121,567
Other	21,200	30,100	30,917
Total	246,000	246,000	246,000

The 3,885-acre reduction in forest land includes 2,500 acres expected to be cleared on the basis of present trends; 1,200 acres expected to be cleared in response to project effects; and an additional 185 acres are to be permanently cleared in channel rights-of-way. Almost all the disturbed open land will revert to its present use. The total area of rights-of-way for project channels will increase 720 acres. Changes in rights-of-way according to wildlife habitat types are shown in the tabulation on the following page.

Approximately 9,000 acres of agricultural land and 400 acres of forest land are expected to be converted to industrial land. The 400 acres of forest land would be cleared regardless of project effects.

Project measures will provide adequate protection to agricultural land in the benefited areas from a rainstorm that is expected to occur, on the average, once every 2 years. Runoff rates from the 2-year storm will exceed designed channel capacities, but the duration and depths of flooding will not be enough to cause significant damages to crops and pastures. Larger, less frequent storms, will cause significant damages. The damages, however, will be less than they would be without the project.

The reduction in flooding and improvement of drainage will reduce the high risks of farming and make it more profitable. Farmers will be able to increase the quality and yields of their crops by improving soil conditions, planting at favorable times, effectively controlling weeds, and harvesting at favorable times.

The total flood damage reduction amounts fo $685,100. Basically, this is reduced in the average annual crop and pasture damages from flooding from an estimated $775,000 to $192,200 (75 percent). The average annual damages to urban property in Donaldsonville will be reduced from an estimated $40,800 to $800. The remaining damages will be limited to nuisance and yard flooding from the 100-year and smaller storms. Indirect damages, such as those to fences, turnrows, field roads, gravel roads, and lawns will be reduced $62,300. The adequate outlets provided by the project will enable farmers to install adequate onfarm drainage systems resulting in changed production inputs and increased yields, and realize an estimated $582,800 in average annual net benefits from improved drainage. The expected net benefits from more intensive use of cropland will average $129,400 annually. These benefits reflect increases in yields resulting from project-induced increases in production inputs and operating efficiency. Improved farming efficiency resulting from installation of project measures will reduce the relative cost per unit of production.

Reduced flooding, improved soil conditions, and improved management resulting from installation of project measures will help to improve the quality of farm products. The additional average annual income due to improved quality is estimated to be $45,000. The project-induced increase in fertilizer use is expected to be 150 tons annually.

Land Use	Existing Channel R.O.W. (Acres)	With Project Channel R.O.W. (Acres)	Change Due To Project (Acres)
Open Land			
Channel	335	366	31
Berm	48	264	216
Spoil	83	314	231
Subtotal	466	944	478
Wooded Channel Banks			
Channel	78	80	2
Berm	21	48	27
Spoil	41	69	28
Subtotal	140	197	57
Forest Land			
Channel	145	145	0
Berm	36	75	39
Spoil	94	127	33
Subtotal	275	347	72
Forest Land-Type 1 Wetland			
Channel	291	300	9
Berm	72	134	62
Spoil	177	205	28
Subtotal	540	639	99
Forest Land-Type 7 Wetland			
Channel	33	33	0
Berm	4	11	7
Spoil	11	18	7
Subtotal	48	62	14
TOTAL	1,469	2,189	720

Peak stages will be slightly increased downstream from channel work as indicated in the tabulation below and at selected points shown on the map on page 71. The stage changes will be greatest at the downstream ends of reaches to be worked. They will diminish rapidly with distance downstream from these points because of the two following reasons: (1) massive storage effect of swamps and lakes, and (2) the variations in times at which peak flows arrive at flow junctions. The combined effects of the Bayou Grosse Tete, Choctaw Bayou, and Lake Verret Watershed projects, as planned, were considered in determining the stage increases. No other anticipated projects that could possibly influence the stage effects are known at this time.

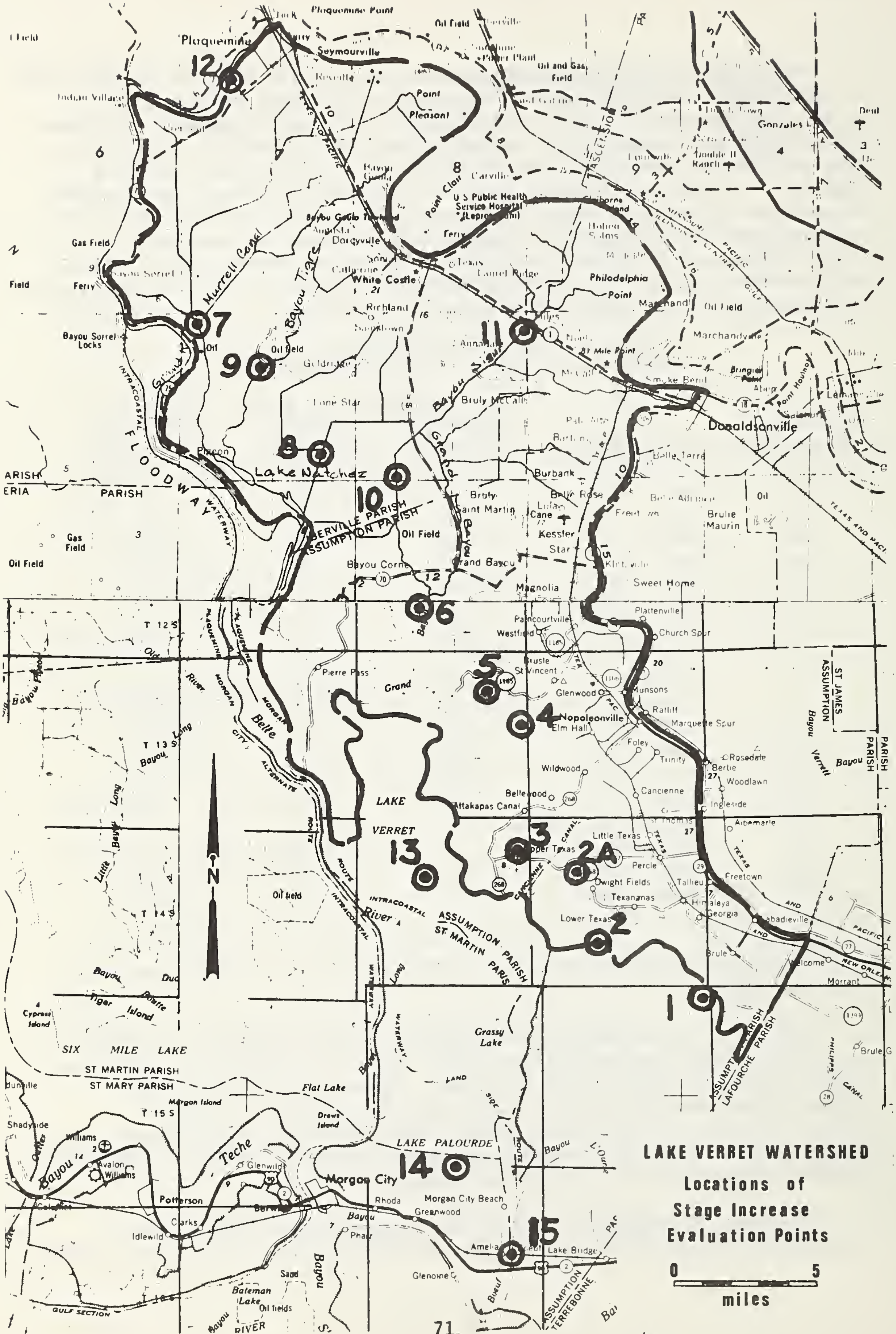
EFFECT OF PROJECT ON DOWNSTREAM STAGES

		Increase in Stage - Feet		
Evaluation Point	Channel No.	2-Year Storm[a/]	10-Year Storm[a/]	100-Year Storm[a/]
1	M-1	0.1	0.1	0.1
2	M-2	0	0	0
2A	M-20	0.2	0.2	0.2
3	M-3	0.3	0.3	0.3
4	M-4	0	0	0
5	M-5	0	0	0
6	M-6	0.2	0.2	0.1
7	L-7C	0.1	0.1	0.1
7	L-7D	0.1	0.1	0.1
8	L-7A	0	0	0
9	L-7B	0.1	0.1	0.1
10	L-6A	0.2	0.2	0.1
11	L-6A	-0.3	-0.2	-0.1
12	M-8	0.2	0.2	0.2
12	Bayou Plaquemine	0	0	0
13	Lake Verret	0	0.1	0.1
14	Lake Palourde	0	0.1	0.1
15	Bayou Boeuf	0	0	0

[a/] Storms with average recurrence intervals of 2, 10, and 100 years, respectively.

Aesthetic resources will be affected in the 60 miles of channel to be worked through forest land and the 17 miles through open land where woody vegetation grows along the banks. Trees inside the channel rights-of-way may be aesthetically pleasing because of unique characteristics of size, form, color, leaf texture, bark, flowers, or fruits. Such trees will be left wherever they will not seriously affect construction or operation and maintenance.

Erosion and Sediment - The planned project will reduce sheet erosion from 1,026,000 tons per year to 1,001,000 tons per year and will



LAKE VERRET WATERSHED

Locations of Stage Increase Evaluation Points

reduce gully erosion from 460,000 tons per year to 347,000 tons per year. Total erosion will be reduced from 1,486,000 tons per year to 1,348,000 tons per year, a reduction of 138,000 tons per year. These reductions are based on computations using accepted soil-loss equations and are also based on land treatment measures. Some of these measures can be applied only after construction due to the existing inadequate outlet conditions. As seen by the preceding figures, most of this reduction is in gully type erosion. This amounts to a 9-percent reduction in erosion. The greatest impact of this decrease will be the reduction in the amount of sediment being deposited in the split ditch system. It is calculated that from the 113,000 tons of gully erosion reduction, there will be a reduction of 81,000 tons of sediment per year being deposited in the split ditch system. Reduction in sediment being delivered to Lake Verret will amount to approximately 1.7 acre-feet per year.

Construction erosion caused by the planned project will amount to approximately 21,000 tons. This 21,000 tons will be eroded during a 3-year construction period and will average approximately 7,000 tons per year for this period. Deposition of this material will depend on several factors: (1) direction of wind, (2) stage of Lake Verret, (3) size and duration of storms, and (4) location of construction areas that have not been revegetated. For the limited construction time it is estimated that sediment derived from construction-induced erosion delivered to the watershed boundary will average less than 3,500 tons per year.

Wildlife - Squirrels reach their highest population density in over-mature hardwood forests. Squirrel populations are currently higher along channel rights-of-way than they will be following construction. Squirrel habitat totaling 698 acres will be cleared for rights-of-way. Plant succession over a period of about 30 years should restore the rights-of-way to near their former condition.

Rabbit habitat along the channel rights-of-way is good and will be good following construction. Grasses will be established on the berm and spoil. Forbs and woody vegetation will naturally succeed the grass stage. These lower successional stages are excellent rabbit habitat. Rabbit populations should not significantly change as a result of the project.

Bobwhite and mourning doves utilize open land areas as primary habitat. Edges of forest land are used for nesting. The conversion of forest land to temporary open land will cause an increase in habitat for bobwhite and doves. After a time lapse of about 3 years, brush type vegetation will dominate these areas and its usefulness for quail and doves will decrease. These areas would still be useful as escape cover for bobwhite. The change in habitat and habitat units is shown in the tabulation on page 73.

CHANGES IN HABITAT AND HABITAT UNITS FOR GAME ANIMALS AS A RESULT OF PROJECT CONSTRUCTIONa/

LAKE VERRET WATERSHED, LOUISIANA

Species	Habitat	Acres Gained or Lost	Number of Habitat Unitsf/
Doveb/	Open Land	+352	+ 18
Quailb/	Open Land	+352	+ 14
Woodcock	Open Land	+667	+ 67
	Forest Landc/	-698	- 70
Squirrel	Forest Landc/	-698	-349
Deer	Forest Landc/	-698	- 35
Rabbit	Open Land	+667	+222
	Forest Landc/	-698	-233
Resident Waterfowl	Forest Landc/	-698	- 14
Migratory Waterfowl	Forest Landc/	-698	- 47
Wild Turkeyd/	Forest Landc/	-698	
Black Beard/	Forest Landc/	-698	

a/ For detailed data on acreage changes for channels, berms, and spoil, see the tabulation on page 69.
b/ Temporary gain. Acreage column does not include rights-of-way changes in Type 1 and 7 wetlands.
c/ Includes right-of-way changes in wooded channel banks, Wetland Types 1 and 7.
d/ Population data not available.
e/ Annual loss or gain.
f/ The acreage of habitat required to support one animal year-round.

CHANGES IN HABITAT AND HABITAT UNITS AS A RESULT OF 1,200 ACRES OF THE PROJECTED INDUCED LAND CLEARING a/

Lake Verret Watershed, Louisiana

Species	Habitat Type	Acres	Number of Habitat Units b/
Dove	Openland	+1,200	+ 60
Quail	Openland	+1,200	+ 48
Woodcock	No Change	-	-
Squirrel	Forest Land	-1,200	-600
Deer	Forest Land	-1,200	- 60
Rabbit	No Change	-	-
Resident Waterfowl	Forest Land	-1,200	- 24
Migratory Waterfowl	Forest Land	-1,200	- 80
Wild Turkey c/	Forest Land	-1,200	
Black Bear c/	Forest Land	-1,200	

a/ An undetermined loss of nongame animals will also accompany this 1,200-acre habitat conversion.
b/ Annual loss or gain.
c/ Population data not available.

White-tailed deer feed on a wide variety of browse plants, mast, mushrooms, and other items. The plant community that currently exists along channel rights-of-way is more diverse than what will be present following construction. However, an abundance of herbaceous and woody vegetation will be present during early succession and will provide important items in the diet of the white-tailed deer. Oak trees and other mast-bearing species will be cleared. This important food source will be eliminated for a long period of time. Bottomland hardwoods totaling 698 acres will be cleared for rights-of-way, resulting in a loss of excellent habitat for deer. This 698-acre habitat loss will also reduce habitat for nongame animals (furbearers) such as raccoon and bobcat.

Habitat conditions for nongame birds will be changed. Research has shown that avian diversity and density is related to plant succession stages. Hamilton and Noble in an article[1/] report that "bird species diversity is lowest in very early seral (succession) stages, higher in later seral stages, and highest at climax. In addition to the increase in diversity, there is an increase of avian, or bird, density with succession." The clearing of forest vegetation along channels will set back plant succession and its resultant impact on bird species. The importance of "edge effect" for avian species is also well documented. As a result of clearing the forest land along channels, 95 miles of edge will result. However, the majority of this edge currently exists since most of these channels have been previously dug.

Fifty-six miles of channel work traverse Type 1 Wetlands. These channels were designed to minimize adverse effects to these wetlands. However, in order to achieve project objectives, the frequency and duration of flooding will be affected on about 15,885 acres of Type 1 Wetlands. Seasonal flooding characteristics will be lost on about 1,555 acres affected by Channels L-1A, L-1B, M-2, M-5, M-20, and L-20A. The remaining 14,330 affected acres of Type 1 Wetlands will only have a small change in flooding characteristics. Fringes, or periphery, of these wetlands will have the most severe change in flooding characteristics. Reduction of feeding areas for waterfowl, furbearers, and other wildlife will occur. Some changes in vegetative composition may result over an extended period of time.

Vegetation composed of mixed bottomland hardwood species will be cleared or disturbed on 348 acres of Type 1 Wetlands for channel rights-of-way. Wildlife species using this valuable habitat will have less food and cover as a result of this clearing. Indigenous forest dwelling species, some migratory species, and some semi-aquatic animals will be adversely affected by this loss. As a result of the spoil placement, the majority of the 348 acres of Type 1 Wetlands will be lost as wetlands.

[1/] Hamilton, Robert B. and Robert E. Noble, "Plant Succession and Interactions with Fauna," Symposium on Management Of Forest and Range Habitat For Non-Game Birds. General Technical Report WO-1. Tuscon: pp. 96-114.

Channel L-7D1 will traverse an area of about 210 acres of Type 7 Wetlands in the northwest portion of the project area. Cypress is the dominant existing vegetation. Disturbances will be limited to one side of the channel and the channel proper for about 2,000 feet. Spoil placement will allow water levels to be maintained the same as currently exists. The structure for water control will restore and maintain water levels above normal ground.

Vegetation composed primarily of baldcypress and tupelogum will be cleared for project channel rights-of-way on 29 acres of Type 7 Wetland. Spoil placement and debris disposal from excavation or maintenance of these channels will convert the 29 acres to a nonwetland type. Wildlife species dependent on the wet nature of the existing wetland will be affected as a result of this construction. Furbearers such as mink and raccoon, semi-aquatic salamanders, and wading birds are examples. Wood ducks also utilize these areas for feeding, roosting, and rearing of young. This habitat for wood ducks will be eliminated. Vegetation invading these areas will be species such as oaks and hackberry, which are more adaptable to drier sites. A 30-acre wetland area will be developed to mitigate the loss of the above-mentioned 29 acres. This area will be intensively managed as a wetland according to a plan for the life of the project (50 years).

The impacts of this project will be minimal on any threatened or endangered species. Alligators occur very commonly throughout the swamps. Channel work may temporarily disrupt some habitat for feeding and nesting. Clearing of trees, such as large cypress, could possibly eliminate potential nesting sites for the Southern bald eagle. The infrequent occurrence or lack of confirmed occurrence of the ivory-billed woodpecker, Bachman's warbler, American peregrine falcon, and brown pelican will probably result in no quantifiable impacts on these species.

Fisheries - Channel work will be done on 117 miles of channels classified as ephemeral. These channels supply habitat for lower food chain organisms such as amphibians, crustaceans, and larval forms of insects. Habitat used by these animals will be disrupted and the productivity will be lowered during construction.

Ninety-five miles of channels containing ponded water will be worked. These channels contain low game fish populations and moderate commercial fish populations. The sample data found on pages 46 and 47 for Grand Bayou are typical of the ponded water fisheries. Vegetative cover along one bank and in the channel proper will be removed. The benthic community will probably be eliminated for an undetermined time period. Turbidity and suspended solids levels will increase during construction and for a while afterwards. This time period will be variable depending upon such factors as rainfall patterns and vegetative establishment on exposed areas. Water temperature may increase during the summer months. A lowering of the biological productivity in the ponded water channels will result from the cover losses, the disruption

of the benthic community, and the increases in turbidity and suspended solids. The primary impact area on fisheries habitat will occur in the ponded water and intermittent channels where channel work will be done. Rotenone samples taken in 1973 and 1975 showed that sport and game fish composed 12.6 percent of the standing crop in Bayou Sigur, a typical ponded water channel. In comparison, Lake Verret rotenone samples for the same two years showed that sport and game fish composed 46.5 percent of the standing crop. The ponded water and intermittent channels have low game and sport fish populations. Some reductions in these populations could occur as a result of the channel work in the ponded and intermittent channels. Recovery of the biological productivity is dependent on (1) recovery of the water quality, (2) recovery of the bank and in-channel cover, and (3) recovery of the benthos. The effects of increased turbidity and suspended solids levels in the lake and bayou waters that will result both during and after project construction are several. Photosynthesis in the water column of the littoral regions will be reduced. This adverse effect will serve to thin out the submerged aquatics component of the plant community. As a result, extensive cover and substrate for phytophilous invertebrates (important as food items for adult and especially juvenile game fishes) will be lost. Cover for juvenile fishes will be lost, resulting in fewer individuals reaching maturity and thereby ultimately reducing reproductive success. Due to decreasing load-carrying capacity of the waterways as they near Lake Verret, the high suspended solids levels will result in increased silt deposition which is especially detrimental in the littoral areas because of physical smothering of the eggs of bottom-nesting game fishes. Benthic communities are greatest in biomass and diversity in the littoral regions. Smothering of the benthic communities further reduces fish food resources. Increased nutrient influx in conjunction with increased turbidities will differentially favor the floating aquatics component of the littoral community. Waterhyacinths and duckweed, because of the great surface area of their root systems suspended in the water column, are able to quickly utilize dissolved nutrients and undergo rapid population expansion. In conditions of over-population these floating aquatics render littoral regions quite unsuitable. This effect is much more prone to stream littoral regions than to open littoral regions of lakes because of less wind and wave action in the former. Channel work will reduce the frequency and duration of overbank flooding on about 5,000 acres of bottomland hardwoods and 15,885 acres of Type 1 Wetlands. The depth, duration, and areal extent of overbank flooding will vary with the volume of storm runoff (size of storm). Channel work will not reduce overbank flooding in the swamps (Type 7 Wetlands). The importance of overbank flooding is shown by comparing present water quality and fisheries in Lake Verret with Bayou Sigur and Grand Bayou. Overbank flow through bottomland hardwood areas contributes organic detritus to downstream areas, which aids in maintenance of biological productivity. The reduction in overbank flow on 20,885 acres of forest lands will reduce the organic detritus transport to downstream areas and some benefits from filtering will also be lost.

Effects of the project construction on the fishery in the 3 miles of intermittent flow channels will be similar to that described for the channels with ponded water. Water temperatures should not significantly change within these intermittent channels.

Mussel populations will decrease in the immediate area of channel work and to undetermined distances downstream. Because they are filter feeders, mussels will be affected by increases in suspended solids, turbidity, and changes in water flow. The association of mussels with leeches, oligochaetes, and other invertebrates will be hindered by channel work. Empty shells and living shells are used for attachment by many invertebrates. The loss of these shells plus the loss of logs, brush piles, and debris on the bottom of channels will reduce attachment sites for these organisms.

During the construction phase a lowering of water quality will occur as a result of increases in turbidity and suspended solids. If out-of-bank flooding occurred during this construction phase, it would introduce this water into the habitat areas of the crawfish. Also, the reduction in out-of-bank flooding in localized areas could also have minor impacts on the crawfish resource.

Air Quality - A slight increase in air pollution will occur during construction from approximately 3 units of diesel-powered construction equipment, 2 service vehicles and disposal of residue. The residue will be disposed of according to Louisiana Air Quality Laws and Regulations.

Water Quality - Water quality and fisheries in Lake Verret are good. The impacts of this project on water quality and fisheries in Lake Verret will be minimal. Water quality in Lake Verret (Station No. 3) is better than that found at Grand Bayou (Station No. 4) and Bayou Sigur (Station No. 5), as shown in appendix H. A comparison of other parameters can also be seen on this tabulation. Ammonia nitrogen levels were higher at Grand Bayou and Bayou Sigur as compared to the Lake Verret station. Phosphate (ortho) levels were consistently higher at Bayou Sigur than at Lake Verret. The proximity of Stations 4 (Grand Bayou) and 5 (Bayou Sigur) to open agricultural areas probably accounts for these differences. According to a study conducted by the Environmental Protection Agency, "Streams draining agricultural watersheds had, on the average, considerably higher nutrient concentrations than those draining forested watersheds. Nutrient concentrations were generally proportional to the percent of land in agriculture. Mean total phosphorus concentrations were nearly 10 times greater in streams draining agricultural lands than in streams draining forested areas. The difference in mean total nitrogen concentrations was about 5-fold".[2/]

[2/] U.S. Environmental Protection Agency, 1976. The Influence of Land Use on Stream Nutrient Levels. National Technical Information Service, Springfield, Virginia.

Increases in turbidity and suspended solids will occur in Lake Verret at its junctions with the channels downstream from project Channels M-3, M-4, M-5, and M-6. These increases will occur during construction and for a time afterwards. No channel work is planned on the lower 1.8 miles of Channel M-3, the lower 3.7 miles of Channel M-4, the lower 2.6 miles of Channel M-5, or the lower 6.0 miles of Channel M-6. These are shown on the project map, appendix C, as outlets for project channels. As a result of maintaining the lower reaches of these channels in their present condition, some filtering will occur. This filtering will serve to eliminate some of the construction-induced turbidity and suspended solids.

Overbank flooding will be reduced on the upper reaches of Channels M-3, M-4, M-5, and L-6A. Where this occurs in forest land, a certain amount of the filtering effect will be reduced. The importance of the swamp acting as a cleansing and filtering agent is clearly shown by comparing present water quality and fisheries in Lake Verret with Bayou Sigur and Grand Bayou. This swamp system will be responsible primarily for reducing adverse impacts to Lake Verret as a result of channel work on Channels M-3, M-4, M-5, L-6A, and laterals.

The projected annual increase in use of 150 tons of chemical fertilizers carries the potential for increase in ammonia nitrogen, nitrate nitrogen, and orthophosphate in the runoff water from the agricultural lands. The amount of fertilizer is not very great. For example, each year the potato growers in Aroostook County, Maine add the equivalent of 140,000 tons of 12-12-12 fertilizer to the 155,000 acres in potatoes. They spray these potatoes 10-12 times a year with pesticides. This crop is grown on slightly sloping land that for the most part drains eventually into the Aroostook River that courses through the potato-growing area. It would appear that if any body of water is subjected to contamination by agricultural chemicals, it should be the Aroostook River. Studies on the chemical quality of this river have revealed no build-up of contaminats from agricultural runoff (The Northern Maine Regional Treatment System, U.S. Environmental Protection Agency, 1973).

The small increase in use of agricultural chemicals that is projected, and the enhanced rate of water removal from the field has the potential of increasing content of these chemicals at the inflow to Lake Verret. Average annual runoff in this area is 3,000 tons of water per acre per year. Thus, the annual runoff from the 51,400 acres of cropland receiving project benefits will be 154,000,000 tons. If this runoff picked up five percent (a high figure) of the 150 tons of added fertilizer, the concentration of plant nutrients (nitrogen, phosphorus, and potassium) in the runoff would be increased by 0.049 ppm. Sampling erros and analytical errors would make such an increase undetectable.

Eutrophication of Lake Verret will be hastened to some small degree as a result of the increases in nutrients. Associated with eutrophication are increases of plankton and blue-green algae blooms causing

oxygen losses, fish fauna changes and increases in larger aquatics, such as waterhyacinth. The kinds and quantities of plant nutrients made available determines the rate at which these changes occur.

Even through the project has the objective of moving the excess water off the farmland following a deluge, this increased rate of water removal from the cultivated land will not appear as a significant increased rate of inflow into Lake Verret because construction will terminate in forested wetlands many miles upstream from the lake. The great expanse of wetlands forest that is encompassed by the watershed acts as capacitance to regulate flow. Nonagricultural land constitutes the major portion of the watershed. Pursuant to a deluge, the rate of water flow from the wetlands forests and associated nonagricultural lands will be the overriding determinant of rate of flow into Lake Verret.

Since the potential increase in agricultural chemicals in the main canals near their outlets will be below the level of detection, and the expanse of wetlands will modulate the flow, the quality of water will not be imperiled. No quantifiable impacts on water quality and fisheries can be assessed on water bodies downstream from Lake Verret.

Land use changes, more intensified agriculture, reduction of out-of-bank flooding, and more rapid removal of surface runoff may result in increases in the amount of pesticides entering the waterways. Any possible increases will occur primarily in the upper portions of the larger bayous such as Grand Bayou and Bayou Sigur. The anticipated project-induced land clearing and the land use conversions will be in the upper portions of the larger drainageways. The increases in pesticides are not expected to reach Lake Verret or other downstream areas because of the cleansing action of the extensive wetlands upstream of Lake Verret. In addition, the increased use of needed conservation practices will help offset increased pesticide concentrations in downstream aquatic environs. The Pesticide Usage Survey indicates that organophosphorus insecticides are currently being used instead of chlorinated hydrocarbons. Endrin, for example, was applied to the sugarcane fields to control borers until the 1967 season, when it was discontinued. Guthion and Azodrin are currently being used to control borers. This trend of "shorter-life" pesticides will be better than using the "long-life" or persistent chlorinated hydrocarbons. Appendix H contains detailed data on the dissipation times for herbicides and insecticides used in the Watershed.

Maximum increases in all pesticide residues as a result of project action are not expected to exceed the tolerance limits or suggested guidelines. In cooperation with the Louisiana State University Feeds and Fertilizer Laboratory, the Louisiana Wild Life and Fisheries Commission, and the U.S. Fish and Wildlife Service, the Soil Conservation Service is monitoring pesticide residues and usage changes. The Watershed will be monitored at least 3 years before construction, during construction, and after construction until residue levels stabilize. This monitoring program will detect any changes in residue levels.

There is a possibility of minor oil spills and resultant impacts during alteration of pipelines at project channel locations even though stringent precautions are taken.

Archaeological, Historical, Scientific, and Unique Scenic Resources

No known archaeological sites will be impacted by the installation of project measures.

There are no properties listed in or nominated to the National Register of Historic Places that will be affected by the installation of project measures. There are no unique scenic resources of national interest nor scenic and/or historic areas of local or regional interest, that will be impacted by the installation of project measures.

There are no known geodetic control survey monuments or resources of scientific value located within the area to be disturbed by the installation of structural measures.

Economic and Social

Agriculture, the economic base of the Watershed, will be enhanced. The project will stimulate agricultural development, and stands to increase the profits of processors and sellers of agricultural products as well as other goods. The economy of the area will benefit from the higher salaries of those presently employed and those hired to do the additional work.

The higher level of protection provides for increased efficiency of production inputs and improved quality of products. This should give the farmers an incentive to increase production inputs. They can, for example, buy better quality seed and more fertilizer and lime.

Installation of the project will create about 99 man-years of local labor over a 3-year period. The expenditure of $7,758,000 for the installation of land treatment measures will create about 200 man-years of labor over a 10-year period. Operation and maintenance will provide 500 man-years of local labor for the life of the project.

The project will help slow the trend of a decreasing number of farms and an increasing size of farms. With the project, labor-saving equipment can be more efficiently used on the farms. This and other factors will decrease unit costs of production and increase yields, thereby increasing the profits from farming. Agriculture can then be more competitive with other industries for labor. This should slow the out-migration trend.

The gross sales of farm products are expected to increase approximately 17 percent. The average annual overall net farm income will increase about $3,700 per farm. It is expected that the income of the farm families in minority groups will be directly benefited by the project. They will have an opportunity to raise their income.

As a result of the change of land use from the installation of project measures, the "Future With Project" conditions will require that 219 acres in forest land will be taken up by channel rights-of-way with the concurrent loss of income from timber products valued at $12 per acre per year.[3/] [4/]

In addition to the above, it was estimated that about 1,200 acres of forest land will be cleared as a result of project-induced clearing. This land has an average annual income of $12 per acre per year[3/] [4/] from timber products and $2 per acre per year from leasing hunting rights.

Temporary interruption of local traffic patterns during the replacement of bridges and culverts will result in inconveniences to the people involved. Detour routes will be available so that no one will be deprived of access to their destination. There is a possibility of temporary power transmission disruptions when utility lines are altered at project channel locations. Also, noise levels will increase at the construction sites.

External economies are expected to accrue after the installation of project measures. The added value of the immediate products and services required in project activities will enhance the overall local economy. The increased production of goods stemming from the project will place new demands on the processing, transporting, and marketing industries within the area. Processors, business establishments, and other individuals not directly benefited, stand to profit from increased sales of their agriculturally associated goods and products. The additional materials and services required as a result of the project and the production of goods and services induced by the project should stimulate local and regional economic activity. As some agricultural products are processed outside the watershed, external economies are not expected to be limited to the watershed area only.

The project will reduce damages significantly to 38 residences in Donaldsonville. These damages are in the form of income loss, damage and destruction of household furnishings, maintenance, and repair costs, and many of the inconveniences caused by flooding. Project installation will improve the overall socio-economic environment of the Town of Donaldsonville.

<u>International Impacts</u>

Sugarcane is the most important agricultural enterprise in the Watershed. This commodity has impacts on international economies and

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[3/] Twelve dollars per acre per year for area inside hunting leases. Fourteen dollars per acre per year for land cleared, hunting lease income lost.

[4/] Investment Analysis of Bottomland Hardwood Stands, SE Area, State & Private Forestry, U.S. Forest Service (Unpublished).

health. World shortages of food, mainly high-energy and high-protein foods, affect the lives of millions of people daily.

Sugarcane production is dependent upon the right combination of soil and climate which, on the United States mainland, is unique to portions of Louisiana, Florida, and Texas. Therefore, there is limited chance of expanding sugarcane acreage. Increased yield per acre is the only way to increase domestic production of sugar. In 1973, the total United States sugar consumption was about 12,000,000 tons, or 102.38 pounds per capita. Of this, about 53 percent was domestically produced, and 47 percent was supplied by foreign producers. It would be advantageous to the United States to increase its own sugar production. This would serve to reduce imports, and to improve the balance of trade.

Favorable Environmental Impacts

Economic activity both agricultural and commercial, in the watershed will increase.

Average annual agricultural damages due to flooding will be reduced 75 percent.

The proportion of costs to value per unit of production will decrease.

The combined programs of land treatment and structural measures will directly benefit 55,300 acres of agricultural land.

Land treatment measures necessary to adequately treat 46,500 acres of agricultural land will be installed. The remaining agricultural land will receive some conservation treatment.

About 8,700 acres of forest land will be retained or managed for wildlife habitat.

About 160 farmers and 480 farm-family members and the employees of those farmers will benefit from increased income.

The average annual gross sales of farm products will increase, resulting in increased average annual net farm incomes.

Installation of structural measures will create 99 man-years of skilled and unskilled jobs available to local labor over a 3-year period. Operation and maintenance will provide 500 man-years of skilled and unskilled jobs available to local labor for the 50-year project life.

Installation of land treatment measures will create about 200 man-years of skilled and unskilled jobs available to local labor over a 10-year period.

All of these 799 man-years of labor are available to both minorities and nonminorities in compliance with all requirements respecting nondiscrimination as contained in the Civil Rights Act of 1964, and the Regulations of the Secretary of Agriculture (7 C.F.R. Sec. 15.1-15.12).

Minority farm-owner families, consisting of less than one percent of the farm families in the Watershed, will increase their incomes.

An estimated 17 minority farm operators, who are cooperators with the soil and water conservation district program, will benefit to the same degree as the other cooperators within the benefited agricultural areas. Some minority farm operators who are not cooperators with the district will benefit, but limited to the degree that needed land treatment measures are applied.

An estimated 63 minority families within the urban flood plain will benefit.

The project will indirectly afford employment opportunities for workers in minority groups.

Increased sugarcane yields will increase domestic supply of sugar, thereby improving the United States balance of trade.

Increased crop yields will provide more efficient use of prime agricultural land and increase production of protein-rich, high-energy foodstuff to help the world's nutritional problems.

Fuel consumption per unit of production will decrease.

The land use change from forest to open land would create an additional 1,200 acres of openland habitat.

The project will reduce urban flood damages in the western urban area of Donaldsonville. It will eliminate flooding from the first floors of 38 houses.

The value of 450 acres in the western urban area of Donaldsonville will increase.

Yard damages and nuisance flooding will be eliminated or reduced within the 450-acre urban area.

Temporary increases in openland habitat along channels will result for bobwhite and mourning doves.

Land treatment practices that reduce sediment will also reduce agrichemicals that may be attached to the sediment.

Land treatment practices for wildlife will retain or improve habitat for wildlife species.

Erosion will be reduced 138,000 tons per year or 9 percent. Sediment removal will be reduced 81,000 tons per year in the split ditch system.

Sediment delivered to Lake Verret will be reduced 1.7 acre-feet per year.

Adverse Environmental Effects

Erosion as a by-product of construction will total 21,000 tons during the project construction period of 3 years or 7,000 tons per year.

Sediment derived from construction that will be delivered to the watershed boundary will average approximately 3,500 tons per year for 3 years.

Water temperatures in ponded water channels will increase slightly.

There will be a slight reduction in air quality in the immediate vicinity of construction due to exhaust and dust from about 3 units of diesel-powered equipment, 2 service vehicles, and disposal of residue.

There will be a temporary increase in noise level due to construction equipment.

Project measures will require an additional 185 acres of forest land for channel rights-of-way. The concurrent loss of income from timber products is valued at $12 per acre per year.

An estimated 1,200 acres of forest land will be cleared as a result of project-induced clearing, with the loss of an average annual income of $12 per acre per year for timber products and $2 per acre per year from leased hunting rights.

Vegetation on about 348 (249 existing and 99 additional) acres of Type 1 Wetland will be cleared for channel right-of-way purposes and a corresponding loss of food and cover for animals utilizing these wetlands.

Frequency and peak stages of flooding as the result of overbank flows on an additional acreage of Type 1 Wetlands will be affected. The effect of direct precipitation and wetness as a result of restricted localized drainage will not be changed.

Vegetation comprised primarily of baldcypress and tupelogum will be cleared for channel right-of-way for construction or maintenance on about 29 (15 existing and 14 additional) acres of Type 7 Wetlands.

The filtering function of about 100,000 acres of Types 1 and 7 Wetlands in the Watershed will be somewhat reduced by the loss of about

377 (192 existing and 185 additional) acres for project channels right-of-way.

About 321 (192 existing and 129 additional) acres of other bottom land hardwoods will be cleared for channel rights-of-way which will result in a loss of habitat for game and nongame animals.

Two hundred fifteen miles of project channel work and maintenance will result in cover losses, disruption of the benthic community, local increases in turbidity and suspended solids during construction, and an overall lowering of the biological productivity.

Some increases in ammonia nitrogen, nitrate nitrogen, and orthophosphate will occur in the Lake Verret system with associated impacts on fish and wildlife populations.

Land use changes, more intensified agriculture, reduction of out-of-bank flooding and more rapid removal of surface runoff will result in increases in the amount of agricultural chemicals entering some waterways with subsequent impacts on fish and wildlife populations.

ALTERNATIVES

Water impoundments are not applicable because the topography of the watershed is flat. Therefore, floodwater retarding structures are not considered an alternative.

Land Treatment Only

The major land treatment measures that could be installed are conservation cropping systems, crop residue management, land smoothing, drainage field ditches, pasture and hayland management, pasture and hayland planting, wildlife wetland habitat management, and wildlife upland habitat management. These measures could only be installed to treat adequately about 56,300 acres of cropland and pastureland that have little or no damages from flooding and inadequate drainage. In addition, some land treatment could be installed on some marginal land. The effectiveness, however, would be limited due to floodwater and drainage problems. The installation cost would be about $4,560,300.

Land treatment measures to reduce wetness by increasing the infiltration of water into these soils are impractical. Most of the soils have relatively high water tables and some have fine soil texture throughout. These conditions restrict the downward movement of water in these soils. Land treatment measures such as drainage field ditches and land smoothing or grading are needed to remove water at or near the surface. These measures could be applied and are presently being applied for this purpose. However, the system of outlets is inadequate. For these reasons, land treatment alone would not provide benefits sufficient for project purposes.

By concentrating a land treatment acceleration program in areas that at the present time are not receiving any floodwater damage, the same reduction in erosion and sedimentation as are being projected for the "planned project" could be achieved. It must be realized that flooding would become more frequent and of longer duration than at present, due to the decrease in channel capacity caused by sediment. There would be no construction-induced erosion with this alternative.

Systems of Levees, Pumps, Channel Work, and Land Treatment

1. Around individual farms or evaluation units

   The flat topography lends itself to establishing levees and installing pumping plants around individual farms or evaluation units. An internal drainage system within each enclosed unit is required to remove the water from within the leveed areas. It is impractical to pump this volume of water. This alternative could be disastrous to downstream areas. A leveed-off field achieving its drainage by pumps would no longer have the trap efficiency of the split ditch system. Most materials presently trapped in the split ditches could be delivered downstream. The cost of installing the levee and

drainage system is $35,800,000. The annual operation and maintenance cost is $2,000,000.

2. <u>On the boundary between the swamp and the agricultural land</u>

This alternative would include leveed floodways to prevent headwater flooding and pumps to remove excess rainfall from the protected areas. Channels would be required inside the leveed areas to deliver water to the pumps. Additional land required for installation of this system would be committed to levees, berms, and channels. Any effective system developed utilizing this combination of methods would greatly increase the amount of earthmoving entailed in construction. It would also proportionally increase the amount of construction erosion. Sediment delivery from the pumped off areas to the watershed boundary would be increased due to the greater velocities developed by pumping. Pumps would increase the noise level and cause pollution from fuel spillage.

Reductions in flooding and improvements in drainage from this approach would result in average annual benefits of about $1,594,300. The estimated total installation cost of this alternative is $34,200,000. The estimated average annual operation and maintenance cost is $2,000,000.

3. <u>Around the northern and eastern bank of Lake Verret</u>

This system would be designed using the swamp as a sump area. Channels would be required to insure the needed level of protection. Additional land, predominately forested, would be required for installation of this system. This land would be committed to levees, berms, and channels. Pumps would increase the noise level, cause pollution from fuel spillage, and could cause excessive erosion and turbidity at discharge points.

Reductions in flooding and improvements in drainage from this approach would result in average annual benefits of about $1,594,300. The estimated total installation cost of this alternative is $19,700,000. The estimated average annual operation and maintenance cost is $1,000,000.

The land treatment program would be the same for each of these three preceding alternatives. The program would include conservation measures to adequately treat 91,900 acres of land and partially treat an additional 7,400 acres, at an installation cost to the farmer of $7,369,000. These conservation measures would be installed singly or in combination as needed. These measures would reduce erosion, improve water quality, improve the tilth of the soil, and reduce wetness.

Change Land Use to Enterprises That Will Tolerate Wet Soil Conditions

Nonstructural alternative uses of the land include forest land, wildlife wetland development, and fish farming.

The Nation's demand for timber products is certain to increase in the future. If present trends of management continue, the demands for forest products will exceed the supply. However, the multiple use of forest land under wet conditions would not alter the existing conditions for production of timber products and other uses of the forest lands of the Watershed.

Southern hardwoods can thrive in the poorly drained areas of the Watershed and can be planted at a cost of $50 per acre. The first intermediate cutting for pulpwood can be made at age 25. Under current management levels, average annual returns from land in hardwood timber is about $12 per acre for forest products[1/] and $2 per acre for wildlife leases.[2/]

Under this alternative, it is estimated that some land could be converted back to bottom land hardwoods at an average annual cost of $1.23 per acre. Likewise, full level annual returns were estimated at $1.95 per acre.

Under present drainage conditions with this alternative, wildlife wetland areas could be developed to provide food and water for waterfowl, furbearers, crawfish, and other wildlife. Development for these purposes would require construction of levees, development of water supplies and installation of pumps and water control structures.

Average annual establishment costs for this purpose are estimated to be $100 per acre. Average annual monetary benefits would be approximately $25 per acre.

Fish farming has been introduced into the area and a potential exists under present drainage conditions for additional development. This operation depends on the available water supply.

The initial capital outlay for developing a fish farming operation is approximately $380 per acre.[3/] The risks in producing a harvestable

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1/ Twelve dollars per acre per year for area inside hunting leases. Fourteen dollars per acre per year for land cleared, hunting lease income lost.

2/ Investment Analysis of Bottomland Hardwood Stands, SE Area, State & Private Forestry, U.S. Forest Service (Unpublished).

3/ James T. Davis and Janice S. Hughes, Channel Catfish Farming in Louisiana (Baton Rouge: Louisiana Wild Life and Fisheries Commission), p. 28.

crop are high, and market opportunities for small operators are limited. Annual returns from this enterprise average $160 per acre. [4] It is estimated that fish farming would increase approximately 20 percent and provide an estimated $4,000 of additional average annual net benefits.

This alternative will increase construction-induced erosion locally. The construction of levees and drainage systems that could be pumped would create some erosion. The installation of pumps would increase the proportion of sediment delivered to the watershed boundary. As stated in the ENVIRONMENTAL SETTING section, ground water suitable for catfish farming is not available in all portions of the Watershed.

Most of this change in land use would occur on poorly drained soils in the Watershed. It is estimated that cropland would be shifted to forest land and to wildlife wetland habitat.

The average annual benefits from wildlife wetland development would not accrue in total directly to landusers. It would be distributed among the various sectors of the local economy for food, lodging, supplies, fuel, etc. These benefits would also depend on hunting pressure and the populations of wildlife occupying these areas. This shift in cropland would result in an average annual loss of net returns based on present conditions. The total average annual costs of this alternative are estimated to be more than the projected total average annual benefits. If this alternative were implemented, the total average annual net benefits derived from the selected plan and land treatment would be foregone.

Land Treatment, Channel Work, and Alternate Outlet

This alternative would involve all of the work described in the PLANNED PROJECT section in addition to an alternate outlet for Lake Verret. This alternative would involve the construction of three locks and four riprap dams and the excavation of a new channel. The diversion channel would begin at the lower end of Lake Verret via Little Texas Bayou into Felix Bayou. Also included is the excavation of a new channel parallel to the secondary levee, into Bayou Cheramie and then into the navigation channel which outlets into Bayou Boeuf. The seven structures would be necessary to assure diversion of normal flows from Lake Verret into the proposed diversion. This would prevent the normal exchange of water from the Lake Verret drainage area into either Grassy Lake or Lake Palourde.

The total estimated installation cost of this alternative would be $69,789,280, which includes $11,657,280 for land treatment and channel work and $58,132,000 for the alternate outlet and appurtenant

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[4] Ibid., p. 41.

structures. Expected benefits to the Lake Verret Watershed would be the same as the planned project.

Channel Work and Restrictive Easements on 21,400 Acres of Bottomland Hardwoods

Consideration of this alternative was given as a result of comments received during interagency review. A major concern was the clearing of bottomland hardwoods (both induced and trend clearing). The alternative includes a proposal to obtain restrictive easements to prevent clearing of bottomland hardwoods that will be affected by project channels.

This alternative would consist of the same structural measures as the selected plan. In addition, easements limiting land use conversion of bottomland hardwoods to cropland on 21,400 acres of existing bottomland hardwoods would be obtained. The easements would be obtained on lands served by the channel work and which have a potential for being converted to cropland due to higher economic returns to landowners. Easements would not be obtained on the 3,650 acres of bottomland hardwoods which are either located outside of the areas served by the channel or the flow regime will not be modified sufficiently to induce land use conversions. It was determined that easements would be needed on the entire acreage subject to land use conversion rather than the amount projected to be cleared by landowners because of the impossibility of specifying which acreage would be cleared.

The easements would limit the use of the land to that compatible with maintaining the existing vegetative composition or possibly enhancing the carrying capacity for existing species of wildlife. Selected logging would be allowed. Public access would be at the discretion of the landowner. Based on existing conditions, much of the area would be available to the public either on a free or fee basis.

The cost of this alternative would be $25,374,060. The cost would be essentially the same as the selected plan plus the cost of the easements which are estimated to be $13,268,000 or $620.00 per acre. This cost would be borne with other than Public Law 566 funds inasmuch as there would be only land rights costs involved and there are no provisions for P.L.-566 cost sharing on land rights in this situation.

The impacts of this alternative would be the same as the selected plan with the following exceptions:

1. The projected 3,700 acres (1,200 project-induced and 2,500 trend) of bottomland hardwood clearing by landowners would be prevented.

2. The associated adverse impacts to wildlife caused by the subject clearing would be eliminated.

3. The economic benefits to landowners realized by converting the 3,700 acres of hardwoods to cropland would be foregone. This amounts to $320,000 per year or $86.50 per acre (based on 1976 prices and costs).

4. The land values would be reduced from a minimum of $1,000 to $300 per acre.

No Project

The "No Project" alternative would include the current land treatment program. At present, 16 percent of the cropland and pastureland has received adequate land treatment. Land adequately treated is defined as land used within its capabilities with applied proper conservation practices to compensate for its limitations. With "No Project," the current rate of installation of land treatment measures on agricultural land will remain about the same.

There would be no change in the current treatment program of forested land. This would not reduce the average annual income of $12 per acre per year, which is predicted for these stands, as they now exist until maturity.

There would not be a loss of an additional 185 acres of forest land for right-of-way clearing. The $12 per acre per year would still be realized.[5/]

There would be a further average income retained from the 1,200 acres of forest land predicted to be cleared after installation of the project. This would be an average annual income of $14 per acre per year since the forest products and income from hunting leases would be retained.[6/]

The "No Project" alternative would forego the reductions in erosion and sediment. It would also assure increases in the frequency and duration of flooding due to the continued reduction of present channel capacity caused by sediment accumulation. This alternative would, of course, entail no project construction erosion.

Water problem areas will continue to exist with this alternative. Sponsors do not have sufficient funds to finance the installation of a complete channel system. Only limited work on certain channels would be done. No orderly, planned procedure would be followed. Appurtenant

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5/ Twelve dollars per acre per year for area inside hunting leases. Fourteen dollars per acre per year for land cleared, hunting lease income lost.

6/ Investment Analysis of Bottomland Hardwood Stands, SE Area, State & Private Forestry, U.S. Forest Service (Unpublished).

measures needed to control erosion and sediment would not be installed. This haphazard approach would result in damages to the vegetative communities and aquatic ecosystems. These damages would not be reduced. The pursuit of this alternative would result in little emphasis being placed on environmental values. If the project is not installed, net annual benefits of about $1,594,300 will be foregone.

SHORT-TERM VS. LONG-TERM USE OF RESOURCES

Many acres of forest land have been cleared since the watershed was settled. However, over 50 percent of the watershed area is still in forest land. Some additional forest is expected to be cleared, but at a slower rate than in the past. Increased residential and commercial development, especially in the vicinity of Donaldsonville is expected. However, this is not expected to occur on a large scale.

The level of drainage and flood protection provided by the project will improve field conditions, allowing for higher crop yields, elimination of unnecessary costs, and better quality products. These conditions will induce farmers to apply more measures and practice better conservation. The increased application of land treatment measures will insure sustained production for future generations. The major land uses are agriculture and forestry, and this is not expected to change. The project, therefore, is compatible with the long-term uses of land and water. The maintenance involved in the project will make it effective in conserving land and water resources after its designed 50-year life. This is true unless new varieties of crops and methods of farming are developed which would require different levels of protection.

Lake Verret Watershed is located in the Lake Maurepas subregion of the Lower Mississippi Region. The subregion includes four soil and water conservation districts and parts of two others. About 24 percent of the land area in the Lake Maurepas subregion is in some stage of development or planning, under Public Law 566.

About 15 percent of the total land area in the Lower Mississippi Water Resource Region is covered by Public Law 566 projects which are either installed or approved for planning. The status of Public Law 566 projects can be observed in the tabulation on the following page.

Extensive flood control measures other than Public Law 566 projects have been installed throughout the Lower Mississippi Region. About 35,000 square miles of the region would be flooded by the Mississippi River were it not for a system of main line and backwater levees, floodways, reservoirs, and channel works. As a result of these improvements, approximately 24,000 square miles receive nearly complete protection from flooding of the Mississippi River. About 3,600 square miles in backwater areas and floodways receive a lesser degree of protection. In addition, systems of reservoirs, levees, and channel works reduce or prevent headwater flooding.

When land treatment measures are installed, this and other similar projects will reduce the amount of sediment delivered to the Gulf Intracoastal Waterway, Morgan City-Port Allen Route. This is considered a long-term effect, as the reduction in sediment would begin within a year after construction begins, and continue throughout the project life.

STATUS OF PUBLIC LAW 566 PROJECTS

Item	Projects Installed		Projects Approved For Planning		Project Applications Received		Total	
	(No.)	(Acres)	(No.)	(Acres)	(No.)	(Acres)	(No.)	(Acres)
Mississippi-Lake Maurepas	1	43,780	4	355,293	-	-	5	399,073
Mississippi Delta Subregion a/								
Louisiana	1	21,600	1	123,000	1	56,320	3	200,920
Total	2	65,380	5	478,293	1	56,320	8	599,993
Lower Mississippi Water Resource Region b/								
Louisiana	7	456,590	20	2,659,270	7	531,820	34	3,647,680
All Other States	19	501,044	40	6,946,689	Not Tabulated		59	7,447,733c/
Total	26	957,634	60	9,605,959	7c/	531,820c/	93c/	11,095,413c/

a/ WRC Subregion; 1972 OBERS Projections, Vol. 4; Water Resource Council, Washington, D.C.; p.3.
b/ Data extracted from Lower Mississippi Region Comprehensive Study Publication App. D, Vol. 1 and 2, February 1974.
c/ Does not contain applications received for states other than Louisiana.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The project will require an additional 720 acres for rights-of-way. This will cause a reduction of 478 acres in open land, of 185 acres in forest land, and of 57 acres in wooded channel banks. This increase in rights-of-way will require an additional 42 acres for channel area, 351 acres for berm, and 327 acres for spoil.

Channels have to be maintained and kept clear of obstructions in order to function as planned. As a result, channels will restrict the use of 42 acres of land for any other purpose for at least the life of the project. Grasses and forbs will be allowed to grow in the channels and on the berms. One side of the channels in forest land or with woody channel banks will not be disturbed, if possible, during construction for the life of the project. Selected trees will be allowed to remain on the berms. No trees will be left in the channels on the side being disturbed, since maintenance equipment access will be necessary. (See appendix E, figures 3 and 4.) The berm and spoil in the open land will be used generally as part of the farm road system. They may also be used for other purposes.

About $12,106,060 will be spent for project installation, including land treatment and structural measures. Project installation expenditures for items such as labor, fuel, equipment, sand, gravel, cement, and steel cannot be reversed.

CONSULTATION AND REVIEW WITH APPROPRIATE AGENCIES AND OTHERS

General

The Louisiana Soil and Water Conservation Committee approved the sponsor's request for planning of the Lake Verret Watershed on February 28, 1967. Authorization to provide planning assistance under Public Law 566, granted on December 18, 1967, was preceded by a meeting on November 8, 1967, of the Sponsors, the Louisiana Department of Public works, and the Soil Conservation Service. This meeting was to coordinate the planning effort for the Lake Verret Watershed. The discussions at the meeting included the design criteria to be used, the location of work for various contracts, measures to be included to reduce adverse impacts on fish and wildlife resources, and cost estimates.

A work outline was prepared to guide the development of a watershed work plan. The work outline identifies the responsibilities of the Sponsors and each discipline of the Soil Conservation Service, and the assistance to be provided by the Fish and Wildlife Service, the U.S. Department of the Interior, the Forest Service, the U.S. Department of Agriculture, the Wild Life and Fisheries Commission, the Forestry Commission, and the Department of Public Works, State of Louisiana. In accordance with the work outline, the structural measures proposed in an earlier draft of the work plan were reviewed by the Louisiana Wild Life and Fisheries Commission. This review indicated that substantial adverse effects would occur. Extensive additional field reviews were conducted jointly with the Louisiana Wild Life and Fisheries Commission, the U.S. Fish and Wildlife Service, and the Soil Conservation Service biologists in an effort to identify the adverse effects. Upon completion of these thorough studies, a summary of the areas where adverse effects may occur was developed together with recommendations for measures to minimize these adverse effects.

In a meeting in January 1968, the Forest Service and the Soil Conservation Service prepared a schedule of needs for forestry contributions to the watershed work plan. These contributions were received in April 1969.

The work plan was completed in November 1969. The project was approved for operations February 20, 1973.

While action was pending on the watershed plan by the congressional committee, the National Environmental Policy Act (NEPA) was enacted. An environmental impact statement was prepared according to guidelines available at that time. Because of the environmentally objectionable nature of parts of the planned work, the Sponsors and the Soil Conservation Service decided to restudy the watershed, supplement the plan as necessary, and prepare a revised environmental impact statement in accordance with current published guidelines. A public meeting was held on May 30, 1973, to announce the intent to prepare a revised environmental impact statement. Ideas, opinions, and suggestions for improving

the work plan were solicited. More than 70 persons attending the meeting were made aware that input was needed for the environmental impact statement to reduce the adverse effects and to improve the plan for the project. This meeting was given statewide newspaper publicity and letters were mailed to individuals, organizations, and agencies that had either requested placement on the mailing list or were known to be interested. Persons attending the meeting represented Federal and State agencies, State Congressmen, local businesses, Sponsors, municipalities and agricultural, oil, recreational, and environmental interests. Concerns, comments, statements, and discussions generated through the meeting helped to guide subsequent studies and planning activity.

On July 16, 1973, representatives of the Soil Conservation Service, the U.S. Fish and Wildlife Service, the Louisiana Wild Life and Fisheries Commission, and the Louisiana Department of Public Works met to prepare a work outline to guide the revision of the Watershed Work Plan to account for new environmental concerns and to comply with NEPA and CEQ guidelines.

In September 1973, representatives of the Soil Conservation Service, the U.S. Fish and Wildlife Service, and the Louisiana Wild Life and Fisheries Commission made a joint reconnaissance of the watershed in order to obtain recommendations concerning revision of the watershed work plan. These recommendations were considered when the plan was revised.

On February 6, 1974, a second public information meeting was held. This session was designed to provide an additional opportunity for interested persons to obtain information and discuss the watershed project. This opportunity was directed toward keeping the public informed, promoting understanding of the plan formulation process, and generating ideas for project improvement. The publicity for this meeting was accomplished through printed news media and notices to individuals and organizations on the current mailing list of concerned parties.

In the summer of 1974, the Soil Conservation Service contracted for the professional services of Dr. Cecil Wadleigh to guide water quality assessments associated with sediment and water yields from the watershed.

On September 6, 1974, a cooperative agreement relative to the Lake Verret Watershed was entered into by the Soil Conservation Service and the Agricultural Research Service. This agreement concerned sediment and water quality analyses and monitoring in the watershed. The U.S. Geological Survey trained Soil Conervation Service personnel in the use of sampling equipment, and rain gauges and in method of determining sediment deliveries associated with significant rainfall events. Dr. Cecil Wadleigh served as consultant in the sediment analysis and monitoring program. Dr. Wadleigh computed ratios and assisted in the analyses conducted by the Soil Conservation Service. The overall pro-

gram provided field data for interpretation comparison and support of the results of standard investigational methods.

Following a field reconnaissance of the watershed in the spring of 1976, the U. S. Fish and Wildlife Service and the Louisiana Wild Life and Fisheries Commission submitted reports that contained recommendations concerning structural measure features of the revised plan. Personnel of the Soil Conservation Service and these two agencies met in August 1976 and fully discussed each recommendation. These recommendations were used in formulating the revised plan.

The Louisiana Art, Historical, and Cultural Preservation Agency and the Curator of Anthropology of Louisiana State University were contacted in an effort to locate resources of cultural, historical, and archaeological importance in the watershed project area. Cooperative agreement AG22scs-00086 (as amended) was entered into with the archaeological faculty at Louisiana State University on April 1, 1975. The agreement provides for the archival and field survey of cultural resources, the assessment of project impact on identified resources, and the formulation of mitigative plans where necessary. The identification of unique resources of social and cultural significance, as well as information on their qualification for the Register of Historic Places, were provided by the university faculty.

Copies of the draft environmental impact statement were distributed to local, State, and Federal agencies and to concerned groups for a local agency review. Following this review, a public meeting was held at 7:00 p.m. on August 8, 1977, in the Ascension Parish Courthouse, Donaldsonville, Louisiana.

Seventy three people attended this public meeting. Each person was given an opportunity to comment on the plan, make a statement, or ask questions concerning the plan and its impacts.

Comments were requested from the following agencies, organizations and individuals: (See attached list in the Summary)

Discussion and Disposition of Each Comment on Draft Revised Statement

Each issue, comment, or suggestion for improvement is summarized and a response is given on the following pages. Comments are numbered where agencies have supplied multiple comments. The original letters of comment appear in appendix G.

United States Environmental Protection Agency

Comment No.1: This statement provides an adequate discussion of the possible impacts that could result in association with implementation of this project.

Response: None necessary

Comment No. 2: We classify your Draft Environmental Impact Statement as LO-1. Specifically, we have no objections to the project as it relates to Environmental Protection Agency's (EPA) legislative mandates. The statement contained sufficient information to evaluate adequately the possible environmental impacts which could result from project implementation. Our classification will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal actions, under Section 309 of the Clean Air Act.

Response: None necessary.

Department of the Army
New Orleans District, Corps of Engineers

Detailed comments:

Comment No. 1: Pages 2 and 19. There is a discrepancy between project channel mileage (168 miles) stated in the first paragraph on page 2 and project channel mileage (215 miles) stated in the first completed paragraph on page 19. This should be clarified.

Response: Channel work is required on 168 miles of project channels. Forty-seven miles are adequate and require no work, only maintenance. Therefore 168+47 = 215 total the miles of project channels.

The first complete sentence on page 18 has been rewritten for clarity as follows: "As shown on the Project Map, appendix C, 168 miles require work. This includes 20 miles to be cleared and 148 miles to be enlarged by excavation. Forty-seven miles require only maintenance."

Comment No. 2: Pages 25 and 109. The references to wetland development on these pages are inadequate relative to providing mitigation to compensate for project effects. The discussions should respond to the following questions:

(a) Would the constructed wetland be adjacent to, part of, or isolated from the existing wetland system?

(b) Would this land be as productive and of equal value and quantity as those wetlands destroyed by project implementation?

(c) Would the newly constructed wetland be available for public use or for private use only?

Response: The fourth sentence of the last paragraph on page 20 has been rewritten as follows: "These losses will be mitigated by the development of wetland wildlife habitat of comparable size and will be intensively managed for waterfowl and crawfish and have habitat values which exceed the 29 acres lost during construction and maintenance."

The fifth sentence of the last paragraph on page 20 has been rewritten as follows: "This area is located in Assumption Parish near Belle Rose on the edge of Type 1 Wetlands."

The Sponsors do not plan to provide public access to the newly constructed area inasmuch as the wetland being destroyed is on private land and public access was not provided. Providing public access would be enhancement instead of mitigation and would also increase the installation and operation and maintenance cost to the sponsors. The EIS was modified to reflect the above.

Comment No. 3: Page 30. The last paragraph on this page should describe the existing vector problems. It should include a list of potential vectors in the description of the Environmental Setting and in Appendix D. Also, structural and/or nonstructural plans for prevention or control of vector problems should be discussed here.

Response: The following has been inserted as a new paragraph on pages 61 and 62 of the PROBLEMS section: Vector Problems - Any species which transmit disease organisms to another species is considered a vector. Insects are the most common, widespread, and important vectors in the project area and include groups such as mosquitoes, houseflies, deerflies, horseflies, and midges. Abundant population levels and high species diversity of these insects, together with plentiful supply of suitable habitat presents a considerable potential for vector problems in the area. The mosquito is the most important vector in the area and the diverse habitat support a large variety of species. The most common vector-borne diseases are swamp fever, dog heartworms, anaplasmoses, and both St. Louis and Venezuelan equine encephalitis. Other vectors in the project of lesser importance as a source of disease transmittal are ticks, fleas, rats, bats, and fox. Since vector control is not a purpose in this project, no specific plans are included for their control.

Comment No. 4: Page 53, Economic Resources. We recommend the use of OBERS Series E projections by the U.S. Department of Commerce be provided in this section. If these are inappropriate, an explanation should be given as to their differences.

Response: OBERS projections cover multi-parish areas and in some cases multi-parish or multi-county areas involving parts of two states. For this reason, the information is of a general nature, and inappropriate for a small watershed project evaluation. Any explanation of the difference between the OBERS information and that contained in the EIS would be meaningless.

Comment No. 5 Page 58, Plant and Animal Resources. A category for algae components that occur in the project area should be included under this section and in appendix D. Perhaps algae could be also included in the discussions on littoral regions on page 64. Apparently, much emphasis is placed on monitoring the water quality of the area, but none is placed on the primary producers and consumers in the aquatic environment, which would be greatly impacted by the proposed project. Certain algae species are excellent indicators of the area's water quality; and, as primary members of the local food webs, they should be considered thoroughly.

Response: Additional data has been added as appendix D-7 and D-8. It was taken from the U.S. Environmental Protection Agency National Eutrophication Survey - Working Paper No. 544 and the Final Supplement to Final Environmental Statement, Atchafalaya River and Bayous Chene, Boeuf, and Black. U.S. Army Corps of Engineers. The data from EPA is from Lake Verret and the data from the Corps is a few miles south of the project area.

Comment No. 6: Page 59. Herbaceous ground cover species exist in hardwood bottomlands and should be included in the discussion here; more species should be added to those already listed in appendix D. Many more herbaceous species exist in the project area than are listed in the text, and these contribute to the support of diverse wildlife populations of the proposed project area.

Response: The following species were added to appendix D under Grasses, Forbs, and Aquatics: Lizardtail *Saururus cernuus*; Frogbit *Limnobium spongia*; Verbena *Verbena brasiliensis*; Giant ragweed *Ambrosia trifida*; Goldenrod *Solidago sp.*; Pennywort *Hydrocotyle sp.*; Pluchea *Pluchea*

purpurascens; Aster Aster spp.; Horned beakrush Rhynchospora corniculata; Cyperus Cyperus spp.; and Spikerush Eleocharis sp.

Comment No. 6a: Add swamp-privet and green ash to the species located in the seasonally flooded hardwood bottomlands.

Response: These were added to the narrative.

Comment No. 6b: We recommend that a discussion on the invertebrate species that exist in the area be included in the text and that these species be listed in appendix D.

Response: The following invertebrate species were added to appendix D. The source is the Final Supplement to Final Environmental Statement, Atchafalaya River and Bayous Chene, Boeuf, and Black, U.S. Army Corps of Engineers. Species listed were collected a few miles south of the project:

Ascellus	(aquatic sowbug)
Hyallela azteca	(scud)
Gammarus species A	(scud)
Gammarus species B	(scud)
Cragonyx sp.	(scud)
Palaemonetes paludosus	(grass shrimp)
Palaemonetes kadiahensis	(grass shrimp)
Taphromysis louisianae	(mysid)
Crayfish	
Corixidae	(water boatman)
Erythrodiplax	(dragonfly larvae)
Physa	(snail)
Hyalla azteca	(scud)
Caenis	(may fly)

Comment No. 7: Page 68. Add "or Threatened" after "Endangered" in the title and include a discussion of the threatened American alligator, which occurs in the proposed project area.

Response: The title was changed to read Threatened and Endangered Species. The following sentence was added to the end of this section on page 50: "The American alligator, a threatened species, occurs in the project area."

Comment No. 8: Page 74. Mention should be made here of the New Orleans-Baton Rouge Metropolitan Area study by the Corps of Engineers, although no interaction is apparent at this time.

Response: Concur; the following has been inserted as a separate paragraph on page 53. "The U.S. Army Corps of Engineers is conducting a study of the New Orleans-Baton Rouge Metropolitan Area. The purpose of the study is to provide a plan for development, utilization, and conservation of water and related land resources in that region."

Comment No. 9: Page 76, last paragraph. The wetlands (100,500 acres) of the overall forested area serve as excellent wildlife habitat and contribute significantly to the adjacent streams and lakes. Alteration of the water regimes of these wetlands would detract from the region's productivity. This would be an example of the cumulative impacts which could result from implementation of a water management project.

Response: The discussion here is related to problems, particularly to forest regeneration and harvesting of timber. See pages 75 through 78 for the discussion of impacts related to wetlands.

No change made in EIS.

Comment No. 10: Page 96, first complete paragraph. Prolonged and frequent flooding would destroy large acreages of diverse wildlife habitat. Numerous plant species which are less water tolerant would be lost. This would result in formation of large ponded areas which would or would not experience revegetation by species of greater flood tolerances. Until they revegetate, these flooded areas would contribute little to the overall area's productivity.

Response: The first sentence of the second paragraph on page 67 has been rewritten for clarity as follows: "Most of the forest land remaining after the expected clearing occurs will continue to flood more often and drain slower than any land in the benefited areas."

Comment No. 11: Page 112, first incomplete paragraph. Reduction in overbank flooding would directly impact plant species composition of these hardwood bottomlands. Significant adverse impacts would occur to those species that require saturated or seasonally saturated soils for growth and reproduction. Loss of this productive habitat would severely impact dependent animal species associated with this habitat.

Response: The impacts of reduction in overbank flooding on plant composition can be found on pages 75 through 78.

General comments:

Comment No. 1: The EIS does not provide any water quality, sediment, and elutriate data to satisfy the requirements of the Environmental Protection Agency regulations concerning discharge of dredged or fill material into navigable waters of the United States ("Federal Register," 5 September 1975). These data are necessary to evaluate the proposed project from the water quality aspect and should be included in the EIS.

Response: We do not feel an EIS is the proper place to include all the necessary data needed for submitting a construction permit request to the U.S. Corps of Engineers. Also, it is planned to use a dragline to contruct the channels. This makes the elutriate tests inappropriate. The EPA reviewed the draft EIS and rated it LO-1, which indicates that it adequately addresses concerns of that agency (see letter appended to the final EIS).

Comment No. 2: A large portion of the proposed project area is influenced by backwater effects of Lower Atchafalaya River flows, and as the river's flowline continues to rise, so will the area's sump levels. The impacts of this trend upon the proposed project apparently have not been addressed in either document. Measures to reduce backwater flooding are being addressed in an ongoing comprehensive study by the Corps of Engineers of the Atchafalaya Basin Floodway project.

Response: SCS is not aware of any trend in maximum stages on the Atchafalaya River that will affect channels in the Lake Verret Watershed. The only connection between the waters of Lake Verret and floodwaters of the Atchafalaya River, except for insignificant lockage transfers, is where the east levee ends in the marsh several miles southwest of the Lake Verret Watershed. At this point which is about four miles from Atchafalaya Bay, the predominant influence on stages is tides of the Gulf of Mexico. Also, any change in backwater influence as a result of changing the flow regime of the Atchafalaya at this point will not affect outlet stages of the watershed significantly for the following reasons:

(1) There is little correlation between maximum stages on the Atchafalaya River and maximum stages in the watershed. There is even less correlation between annual maximum rainfall for local flooding and annual maximum stages on the Atchafalaya River.

(2) The change in maximum stage at the end of the levee that might occur as a result of extending the levee a few miles would be severely dampened or eliminated by the storage in the reach between the end of the levee and Lake Verret.

In a letter dated March 1, 1977, to Mr. Alton Mangum, State Conservationist, Soil Conservation Service, from Colonel Early J. Rush III, New Orleans District Engineers, U.S. Army Corps of Engineers, it is stated that the proposed Lake Verret Watershed project would not foreclose any options for accomplishing the purpose of the Atchafalaya Basin Comprehensive Study.

Comment No. 3: We suggest the the following paragraph be added to page 93: "The Corps of Engineers, Department of the Army, has the responsibility for regulating disposal of dredged or fill material in waters of the United States, including wetland areas, as defined in the permit regulations of the Corps of Engineers (33 CFR 320 through 329). Permits must be obtained for such disposal, pursuant to the rules and regulations of the regulatory program, as published on 19 July 1977 in the "Federal Register" 42(138), pages 37,122 through 37,164."

Response: Concur; this statement has been added as a new paragraph to the Relationship To Land Use Plans, Policies, and Controls section, page 65.

Comment No. 4: Considerations used in establishing the hydrologic parameters of the watershed work plan are considered sound.

Response: None necessary.

United States Department Of Commerce

General comments:

The FEIS should discuss the potential project impacts on the freshwater and estuarine fishery resources downstream from Lake Verret.

Response: No quantifiable impacts will occur on the freshwater and estuarine fisheries downstream from Lake Verret. No change made in EIS.

Specific Comments:

Comment No. 1: Environmental Impacts. Adverse Environmental Effects. Page 125 (also Summary Sheet on page 5). The DEIS states that, "Some increases in ammonia nitrogen, nitrate nitrogen, and orthophosphate will occur in the Lake Verret system with associated impacts on fish and wildlife populations" and that "Land use changes, more intensified agriculture, reduction of out-of-bank flooding and more rapid removal of surface run-off will result in increases in the amount of agricultural chemicals entering some waterways with subsequent impacts on fish and wildlife populations."

The FEIS should specify the life stages and species of fish and shell fish that would be impacted, and what impacts would be anticipated. Since chemical fertilizer components are mentioned in the first quoted sentence, it appears that the agricultural chemicals mentioned in the second sentence would primarily be pesticides. Therefore, the kinds and amounts of each pesticide anticipated for use in the watershed, if the project were completed should be presented along with a thorough review of the impacts of each on life stages of the most common species of fish and shellfish in the area.

Response: The projected increase in use of 150 tons of chemical fertilizers carries the potential for increase in ammonia nitrogen, nitrate nitrogen, and orthophosphate in the runoff water from the agricultural lands. The amount of fertilizer is not very great. For example, each year the potato growers in Aroostock County, Maine add the equivalent of 140,000 tons of 12-12-12 fertilizer to the 155,000 acres in potatoes. They spray these potatoes 10-12 times a year with pesticides. This crop is grown on slightly sloping land that for the most part drains eventually into the Aroostook River that courses through the potato growing area. It would appear that if any body of water is subjected to contamination by agricultural chemicals, it should be the Aroostook River. Studies on the chemical quality of this river have revealed no build-up of contaminants from agricultural runoff (The Northern Maine Regional Treatment System, U.S. Environmental Protection Agency, 1973).

The small increase in use of agricultural chemicals that is projected, and the enhanced rate of water removal from the field has the potential of increasing content of these chemicals at the inflow to Lake Verret. Average annual runoff in this area is 3,000 tons of water per acre per year. Thus, the annual runoff from the 51,400 acres of cropland receiving project benefits will be 154,000,000 tons. If this runoff picked up five percent (a high figure) of the 150 tons of added fertilizer, the concentration of plant nutrients (nitrogen, phosphorus, and potassium) in the runoff would be increased by 0.049 ppm. Sampling errors and analytical errors would make such an increase undetectable.

There is plenty of room for doubt that an influx of plant nutrients into Lake Verret would be sole cause of algal blooms. There are good indications that an input of organic matter producing CO_2 is essential for algal proliferation. Prof. Shapiro, limnologist at the University of Minnesota, has studied the serious algal blooms on Lake Minnestonka near Minneapolis. He has concluded that these blooms are not related to an inflow of plant nutrients from agricultural land, but are directly related to the inflow of organic matter such as raw sewage.

Appendix D-5 and D-6 contains a list of fish species as indicated through rotenone sampling. Appendix H-6 contains a list of pesticides currently being used in the area, application rates, acres receiving application, number of applications per year, and the total volume. The kinds and amounts of pesticides will probably remain relatively stable for the next few years. New pesticides are regularly being placed on the market and undoubtedly some new ones will be used in future years. The SCS has no way of predicting the rate that new pesticides will become available nor the rate the landowners will adopt their use. Toxicities are highly variable and a literature review revealed a variation of .022 ppm Guthion for a 96-hour TLm for largemouth bass to a 5,000.0 ppm 24-hour LC_{50} for bluegill. Appendix H-8 has been added to the EIS and contains the toxicity of most of the pesticides for some common fish species in the project area.

Comment No. 2: Structural Measures, Water Quality, page 113. It is stated that, "Nutrient concentrations were generally proportional to the percent of land in agriculture" and on page 115 that, "The increase in pesticides are not expected to reach Lake Verret or other downstream areas because of the cleansing

action of the extensive wetlands upstream of Lake Verret. In addition, the increased use of needed conservation practices will help offset increased pesticide concentrations in downstream aquatic environs." It should be explained whether pesticide concentrations would be proportional to the percentage of land in agriculture as with nutrient concentrations. The cleansing action of wetlands with regard to pesticides should be discussed and documented for each toxic compound expected to be used. The "needed conservation practices" should also be described, including a discussion on the extent and manner in which they would reduce the various pesticide concentrations downstream.

Response: The importance of swamps system (wetlands) as a cleansing and filtering agent is readily apparent when the water quality data on pages 35, 36, and H-2 through H-5 is evaluated. Levels can be compared at the sample stations above and below the swamp system. As a result of shorter life pesticides currently being used and other factors, any increases resulting from project action would occur in channels near the agricultural areas. The pesticide concentrations should be related to the amount of land in agriculture.

The conservation measures are described on pages 12 and 14. Since most pesticides used in the watershed are transported in runoff water, attached to soil particles, a reduction in erosion will have a corresponding reduction in pesticide concentrations downstream. In a report submitted to the President of the United States by the Secretary of Agriculture and Director of the Office of Science and Technology in 1969, it was stated that "... Proper land management and erosion control measures is the most direct and usually the most satisfactory approach to dealing with most sediment problems... Such practices as mulching (crop residue management), strip-cropping, and contour cultivation have been shown to be highly effective in reducing soil erosion on farmland." The above two paragraphs have replaced the fourth paragraph on page 79.

Comment No. 3: The probability and resulting impacts of bio-accumulation of any of the toxic pesticides in organisms using or entering estuarine nursery areas downstream from Lake Verret, and any other waters into which this project would drain, should be thoroughly discussed. This presentation should include separate discussions for each pesticide that

would be involved and how each would be expected to impact the most common species of fish and shellfish in the recreational and commercial fisheries along this part of the Louisiana coast.

Response: The pesticide usage survey conducted in the project area showed no use of chlorinated hydrocarbons. Two insecticides are currently being used for borers; they are Guthion and Azodrin. These compounds are organophosphates and degrade rapidly. None of the water, sediment, or fish tissue samples taken from 1973 to the present have shown any residues of either of these compounds. Two of the sample stations are near agricultural areas. The herbicides currently being used are listed in appendix H-6. These compounds have not been known to be bio-accumulative. The probability of bio-accumulation in the project area or downstream is highly unlikely since pesticides currently being used are short-lived ones and residue levels from prior usage of chlorinated hydrocarbons are very low.

No change made in EIS.

Comment No. 4: Appendix H. Water Quality Data. The tables reporting pesticide levels should be revised to include estimates of the levels that would be anticipated upon completion of the project.

Response: See response to comments nos. 2 and 3.

United States Department of the Interior
Office of the Secretary

We find that these documents adequately consider most areas that fall within our juristidction and/or special expertise. However, for clarification purposes we do wish to make the following comments.

Comment No. 1: We are pleased to note that most of the comments made by us on the preliminary draft statement have been incorporated into the revised draft statement. We do have a concern with the mitigation discussion described on page 25 of the draft statement. In the final statement we suggest using the term "loss prevention" to cover all activities that attempt to avoid or compensate for project induced fish and wildlife losses.

Response: SCS policy concerning mitigation of unavoidable losses of Types 3 through 20 Wetlands due to project action is contained in Conservation Planning Memorandum 15, dated

May 5, 1975. In policy item #4, it is stated, "If such projects include features for other purposes that unavoidably result in the losses to Types 3 through 20 Wetlands, the loss is to be mitigated by establishing wetland habitat values in the same vicinity that are equivalent, insofar as possible, to the wetland habitat values lost."

Some of the specific measures discussed on pages 21 and 22 could possibly be termed "loss prevention" because of this intent which is, to minimize adverse effects to the plant, animal, and aquatic resources. No change made in EIS.

Comment No. 2: The area to be developed into a Type 1 Wetland is described as a productive bottomland hardwood area. This area is presently deemed to be valuable from a wildlife standpoint. Any plan to establish this area as a crawfish/waterfowl pond will enhance these species of fish and wildlife, but only at the expense of the terrestrial wildlife species such as white-tailed deer and wild turkey. We suggest developing the crawfish/waterfowl area on private land. Since this development will not be available to the general public, the land acquisition and development is one of enhancement instead of mitigation. To compensate for the loss of 27 acres of Type 7 Wetlands, we suggest acquisition of an area with minimal wildlife values such as an abandoned or marginal farm land for wetland development. Such a development must be opened to the public.

Response: SCS policy states that when projects include features that unavoidably result in losses to Types 3 through 20 Wetlands, the loss is to be mitigated by establishing wetland habitat values in the same vicinity that are equivalent, insofar as possible, to the wetland habitat values lost.

The planned wetland development will have comparable habitat values to those lost on the 29 acres of Type 7. The wetland development will be on private land. The sponsors do not plan to provide public access to the newly constructed area inasmuch as the wetland being destroyed is on private land and public access was not provided. Providing public access would be enhanced instead of mitigation and would also increase the installation and operation and maintenance cost to the sponsors. The EIS was modified to reflect the above. On future projects, considerations will be given to areas that have minimal wildlife values as sites for mitigation.

The landowner of the wetland mitigation area will be required to sign a 50-year agreement with the sponsors of the project stating that the area will be managed as a wetland for this time period (life of the project).

Comment No. 3: We assume the compensation features will be subject to a Corps of Engineers permit. To avoid any future conflict, we suggest additional coordination with our Fish and Wildlife Service on the development of the compensation plan.

Response: The planned mitigation measure has been coordinated with personnel of the U.S. Fish and Wildlife Service (Lafayette, Louisiana office) and Louisiana Department of Wildlife and Fisheries.

Comment No. 4: On page 112 of the draft environmental statement we suggest that the magnitude of the reduction in fish populations due to channel enlargement should be estimated on a percentage basis.

Response: Research in Louisiana has been very limited concerning fish populations and their responses to channel work. A monitoring project was initiated in 1973 to determine the effects this project would have on fish populations. After this project has been constructed and sampling is complete, we will have some actual sample data from Louisiana to base such estimates on. At present, lack of research data from Louisiana would make such estimates unreliable.

United States Department of Agriculture
Office of the Secretary

Comment: We have reviewed the draft revised statement with special interest in your assessment of the impacts of proposed actions upon minority group persons living in or near the project area or otherwise affected by the proposed actions.

We are pleased to note, at pages 3, 54ff and 121ff, that you have included minority socioeconomic information and estimate the effects of the proposed action to fall equally upon minorities and non-minorities alike. Also, at p. vi of the Watershed Plan Agreement, you have included a nondiscrimination agreement to be signed by all parties.

Thank you for your time and effort to assure equitable treatment for all persons affected by these actions.

Response: None necessary.

Department of Health, Education, and Welfare
Public Health Service
Center for Disease Control

Comment: We have reviewed the draft revised environmental impact statement and draft supplemental watershed work plan agreement for the Lake Verret Watershed, Louisiana. The proposed work should not create additional mosquito breeding sites in the area and therefore, an adverse vector-borne disease impact should not result from this project.

Response: None necessary.

State of Louisiana
Department of Transportation and Development
Soil and Water Conservation Committee

Comment: The Louisiana State Soil and Water Conservation Committee has reviewed and approved the supplemental work plan and environmental impact statement and has no further suggestions to make.

Response: None necessary.

State of Louisiana
Department of Wild Life and Fisheries

As you know our staff has assisted your personnel in an attempt to develop a plan that will minimize damages to the fish and wildlife populations in the project area. We are pleased to see that some of our suggestions have been used in the preparation of this document.

Comment No. 1: Page 5, Adverse Impacts, 7th and 8th paragraphs. Should read: "Some increases in ammonia nitrogen, nitrate nitrogen, and orthophosphates will occur in the Lake Verret system with adverse effects on fish and wildlife populations.

"Land use changes, more intensified agriculture, reduction of out-of-bank flooding, and more rapid removal of surface runoff will result in increases in the amount of agricultural chemicals entering the waterways associated with this system and will have adverse effects on fish and wildlife populations found in the project area."

Response: Since each of these paragraphs listed is under the heading Adverse, it doesn't appear necessary to repeat it again in each paragraph.

Comment No. 2: Page 18, 1st paragraph. The last sentence is inadequate by not giving the actual number of individual land users who have voluntarily applied and installed land treatment measures in other PL-566 projects in Louisiana. The last sentence should cite the actual information available from records on land treatment measures installed.

Response: Of the 38 watersheds in Louisiana that have been approved for operations in the last 18 years, 12 have completely installed the planned land treatment program. More than 75 percent of the planned land treatment program has been installed on another site. The remaining 20 has either been approved for operations recently or installation of structure measures have been delayed pending the preparation of Environmental Impact Statements. The fourth paragraph on page 15 has been changed to include the above narrative.

Comment No. 3: Page 94, 1st paragraph. First sentence "will result" should be changed to "may result".

Response: SCS feels that adequate land treatement of 46,500 acres of cropland "will result" from the planned land treatment program. No change made in EIS.

Comment No. 4: Page 95, 3rd paragraph. The 1200 acres is not identified by location and is only a determination based on various indirect factors without the involvment of the land owners. We feel this amount is too low and should be increased.

Response: The expected project-induced clearing is based on the the following items of consideration: (1) location of forest land in relation to any particular P.L.-566 project channel; (2) soil association or soil capability class; (3) elevation; (4) ownership patterns; (5) local (SCS) knowledge of individual landowner's past performances. No landowners are contacted or involved in making these determinations. Therefore, these areas are not specifically located.

The SCS feels that the above described method is reasonable and takes into account factors from which to make a good estimate of project-induced clearing of forest lands. This 1,200 acres does not include lands that would be cleared without (regardless of) the project (trend clearing). No change made in EIS.

Comment No. 5: Page 115, last paragraph. Pesticide levels will also be increased by the dredging activity which will agitate and release these pesticides from the sediments. Pesticides can be expected to reach the Lake Verret and other downstream areas.

Response: Pesticide levels in sediments were monitored between July, 1973 and August, 1975 at five locations. A total of 29 samples were taken. Thirteen (45%) of the samples were negative for pesticides. The remaining 16 (55%) were positive; however, the residue levels were very low. Pesticide levels ranged from a low of .01 ppm DDE to .15 ppm Aldrin. The mean for the total 29 samples was .02 ppm. Total residues in the 29 samples was only .71 ppm. (See appendix H-2 through H-5). With these very low levels in bottom sediments, and the use of dragline for construction, the agitation and release of these pesticides as a result of channel work would have a very minor impact, if any at all. No change made in EIS.

Comment No. 6: Spoil from M-2 should be placed on the north side of the canal to aid in retaining wastewater from sugar mills in its semi-holding pond. This measure would include blocking off any draining canals, sloughs or other such waterways entering these canals from the north.

Response: Concur; all excavation of Channel M-2 is planned to be from the north side. Spoil will be placed continuous for the length of planned excavation in this area. No change made in EIS.

Comment No. 7: Spoil from M-4 should be placed on the south side of the canal.

Response: At present, there is a protection levee that is also a road with an average top width of 30 feet along the south side of Channel M-4 opposite the forested area. There also exists a field drainage channel on the south side of, and parallel to, the protection levee. It is questionable whether or not there exists sufficient area on the levee (road) to deposit and retain the amount and type of material to be excavated. This request will be pursued further during the construction phase of this project and will be honored if at all possible. No change made in EIS.

Comment No. 8: Dredging on M-3, L-3A, L-3B, and L-6A should be eliminated due to high wildlife and fish resource losses expected to occur as a result of this construction.

Response: Channel M-3 is to be enlarged approximately one-half mile through Type 1 Wetland in order to provide an outlet for Channels L-3A and L-3B which are planned to generally follow the tree line in the open land. The channel work planned on Channel L-6A is the least damaging to wildlife and fish resources of the alternative for providing flood protection and drainage to the openland in this area. The choice was made to enlarge Channel L-6A for a distance of about two miles downstream from its confluence with Grand Bayou (M-6) rather than enlarge Grand Bayou for about five and a half miles. No change made in EIS.

Comment No. 9: The use of explosives for excavation of channels through wooded areas has been shown to have a lesser impact on the fish and wildlife resources than conventional dredging methods.

Response: Some experimental or research work on this type of excavation has been done by the U.S. Corps of Engineers in the Saline Wildlife Management Area in Louisiana and other states. SCS expects to observe this work in Louisiana, and study the report on this work by the USCE when available. Hopefully, some feasible alternative methods of excavation can be derived from this study. No change made in EIS.

Comment No. 10: Public Recreational Use of the proposed mitigation area will be extremely limited. Although the management plan and construction of the mitigation area will be accomplished with public funds on private land, there are no provisions for public use of this area. While adequate mitigation is both a desirable and commendable project feature, we feel that this type of mitigation area does not fulfill the intended purposes of the mitigation process.

Response: SCS policy requires the mitigation of wetland Types 3 through 20 when drained or otherwise altered as a result of project action (see second paragraph of Planned Project). There will be a loss in this project of about 29 acres of Type 7 Wetland, including existing berm and spoil land, as a result of project channel rights-of-way. The planned development of a 30-acre wetland area is for mitigation of the 29 acres of Type 7 Wetlands. SCS policy further states that losses of wetland Types 3 through 20 will be mitigated by establishing wetland habitat values in the same vicinity that are equivalent, insofar as possible, to the wetland habitat values lost. The planned wetland development will be intensively managed for waterfowl and crawfish and have habitat

values which exceed the 29 acres being lost during construction and maintenance. The sponsors do not plan to provide public access to the newly constructed area inasmuch as the wetland being destroyed is on private land and public access was not provided. Providing public access would be enhancement instead of mitigation and would increase the installation and operation and maintenance cost to the sponsors. The EIS was modified to reflect the above.

Louisiana Department of Agriculture

Comment: I have reviewed with more than common interest your excellent Environmental Impact Statement regarding Lake Verret Watershed.

As Commissioner of Agriculture for the State of Louisiana, I fully concur in your efforts for a planned project to improve not only the agricultural cropland, pasture and woodland, but also the recreational opportunities for that area.

Since Lake Verret is one of the favorite fishing areas for Baton Rouge sportsmen, I am sure many of us are going to stay constantly abreast of the progress envisioned by this project.

Response: None necessary.

State of Louisiana
Office of Science, Technology and Environmental Policy

Comment: The above-referenced matter concerning environmental quality has been received and reviewed by the staff of the Governor's Council on Environmental Quality. From the information contained in the package sent to our office, the Council issues a no objection on this particular project. The rules and regulations governing this project should continue to be in full compliance with all State and Federal regulatory agencies.

Response: None necessary.

Wildlife Management Institute

Comment No. 1 Project induced clearing of 1,200 acres of bottomland hardwood forest (pages 4, 95, 118) is an unacceptable effect of a PL-566 Watershed Project. This loss of forest is in addition to the loss of 698 acres of wooded wildlife habitat (page 105) for channel excavation. If the proposed drainage system cannot be constructed in such a manner that will not provide drainage of woodlands conducive to clearing, then perpetual easements or some other similar arrangement should be found to insure that publicly financed drainage is not contributing tc the destruction of bottomland hardwood forest.

Response: The anticipated project-induced clearing of 1,200 acres of bottomland hardwoods is expected to be on lands that can be adequately drained by installing field ditches and channels connecting the field ditches to project channels. Adequate outlets will be available as an incidental result of project installation. (See response to Comment No. 3).

The acceptability, as a project effect, of induced clearing of 1,200 acres of bottomland hardwoods should be determined by the same criteria as the acceptability of the loss of 698 acres of wooded wildlife habitat for channel excavation. These criteria include economic considerations. From this standpoint, the difference in effect of the expected clearing of 1,200 acres for agriculture and the planned clearing of 698 acres for channel excavation is that the 1,200 acres will be economically productive. Although the projected loss of the 1,200 acres of bottomland hardwoods is regretable, it is not necessarily unacceptable, and is not in violation of SCS regulations. (See response to Comment No. 2)

No change made in EIS.

Comment No. 2 The development of a 30-acre wetland (page 109) to replace the loss of 29 acres of wood duck habitat loss for channel excavation seems inadequate mitigation for total loss of wooded wetland habitat. Additional mitigation appears to be in order. Also, are any provisions being made for public access and hunting on this wetland area to be developed as a project expense?

Response: SCS policy requires the mitigation of wetland Types 3 through 20 when drained or otherwise altered as a result of project action (see second paragraph of Planned Project). There will be a loss in this project of about 29 acres of Type 7 Wetlands, including existing berm and spoilbank, as a result of project channel rights-of-way. The planned development of a 30 acre wetland area is for mitigation of the 29 acres of Type 7 Wetlands. SCS policy further states that losses of wetland Types 3 through 20 will be mitigated by establishing wetland habitat values in the same vicinity that are equivalent, insofar as possible, to the wetland habitat values lost. The planned wetland development will be intensively managed for waterfowl and crawfish and have habitat values which exceed the 29 acres being lost during project construction and maintenance. The sponsoring local organizations chose not to provide public access at the planned mitigation area because of the cost of landrights and operation and maintenance. In veiw of the fact that the land being destroyed is in private ownership, the SCS feels that no Federal statue including NEPA requires public access in situations such as these. This decision does not preclude public access being provided under other programs. No change made in EIS.

Comment No. 3: Despite SCS regulations to the contrary past watershed projects in Louisiana have resulted in conversion of large acreages of bottomland hardwood forest to rowcrop agriculture. Assurances were made that this practice would be discontinued (see paragraph 1, page 24), but apparently the SCS in Louisiana plans to continue bringing land into cultivation. Page 107 indicates loss of seasonal flooding on 1,555 acres and alteration of flooding on an additional 14,330 acres of Type 1 Wetlands.

Response: The alteration of flooding on 15,885 acres of Type 1 Wetlands is incidental to the design that is necessary to meet project objectives. Only 1,555 acres of Type 1 Wetlands will be impacted to the extent that they will be frequently flooded instead of seasonally flooded. The remaining 14,330 acres will be impacted to varying de-

grees by reductions in the duration of seasonal flooding. None of the 15,885 acres will be suitable for conversion to pasture or crops.

Comment No. 4: Serious question arises therefore as to the confidence that can be placed in the assurances in the Draft EIS that 20,700 acres of forest land for upland and wetland wildlife habitat will be retained (page 17, footnote 3). What type of arrangement has been made to secure the retention of these woodlands?

Response: These measures will be installed by the landusers voluntarily as part of their conservation plan. Twelve thousand acres of this 20,700 has already been included in conservation plans since the watershed became operational and is presently being retained. This is indicative of the interest in these conservation practices. There are no arrangements to "secure the retention of wetlands." The application of wildlife retention practices, like other conservation practices are installed at landowner expense on a voluntary basis. No change made in EIS.

Comment No. 5: The statement on page 84 to the effect that erosion is not a major problem due to (1) deep soils, (2) retention of eroded material in the fields and (3) nearly level slope of the land is surprising since the very next sentence indicates an erosion rate of 4.17 tons per acre! This is on the threshhold of the rate of 5 tons per acre felt to be adverse to productivity even on deep soils. While the EIS talks about the reduction in erosion rate due to land treatment measures, very little reduction will occur. In fact, the estimated reduction is only 9.3 percent (using figures on page 101)! This is really not that surprising an estimate since the major "conservation" land treatment practice for on farm application is ditching. What would be surprising is actually accomplishing a 9.3 percent reduction in erosion and the predicted reduction in sedimentation.

Response: The erosion rate of 4.17 tons per acre per year is the value computed for an erosion rate for the watershed. The reasons for concluding this is not a major problem have been stated. For clarification purposes erosion, as has been used here, refers to the displacement of soil from its resting place. In this case the land has very little slope and much of the material that has been eroded is deposited in the same field; a large portion of

the eroded material is replaced on the rows the next time the field is plowed. Thus the 4.17 tons per acre is not an expression of the amount of soil reaching downstream waters.

In the case of deep soils such as are found in the Lake Verret Watershed, the downstream effects of the sediment produced by erosion are more deleterious than the soil loss. The 5 tons recommended limit takes this into consideration.

The estimated reduction of 9.3 percent is based on computations dependent on the land treatment program. This land treatment program is a realistic appraisal of measures that is practical to implement.

No change made in EIS.

Comment No. 6: The presentation and data on fish populations on pages 64-68 and 109-112 are most interesting and revealing. In general this information shows an increase in game and fish, and decrease in carp as the distance from the major agricultural areas increases. This could very likely be correlated with various aspects of water quality, particularly turbidity and pesticides.

Response: Concur; no change made in EIS.

Comment No. 7: The discussion of economic and social aspects in the Draft EIS is greatly misleading. While not questioning the need for better drainage for residential areas in Donaldsonville or the needs of certain disadvantaged groups and small farmers, serious question is raised as to the major beneficiaries of the proposed rural drainage aspects of the project. A lot of statistics are presented on farm income, etc. which cloud the fact that very little benefit will accrue other than to relatively large sugarcane and soybean farming operations.

Response: The discussion on the economic and social conditions are given in the SETTING and PROBLEMS section of the EIS, to show the conditions that exist in the watershed area in keeping with the "SCS Guidelines for Preparation of Environmental Impact Statements" as published in the Federal Register. The statistics that are presented are required as published in the guidelines. There is no intent to cloud the fact that large landowners and landusers will benefit from the project. The number of farmers and farm families that will directly benefit from the project are shown in the IMPACTS section of the EIS.

Included in this number of benefited landowners are large and small alike. The table on page 39 shows the distribution of farm size by parishes.

The project is evaluated on average watershed conditions. It is estimated that there are 350 farms in the watershed averaging 370 acres per farm. It is also estimated that average annual overall net farm income will increase about $3,700 per farm. Location of the problem area and number of ownerships determines the beneficiaries, not the size of the farming operation.

No change made in EIS.

Comment No. 8: Great pains are taken to recite figures on population, unemployment, median income, etc. (pages 53-55) and 88-92). Information on page 56 indicates (1969 figures) a fair number of small farms which brings down the average farm size; however, many of the small farms are marginal operations with the major source of income derived from employment elsewhere, particularly at the chemical plants, etc., along the Mississippi River. Operation and income from these farms can be expected to change little due to the watershed project. In fact, the only two crops that production figures are presented for on page 56 are sugarcane and soybeans, crops that are grown on medium to large farms.

Response: A farm, as defined in the 1974 Census of Agriculture, includes all land on which agricultural operations are conducted at any time in the year under the day-to-day control of an individual management, and from which $1,000 or more of agricultural products are sold during the year. Places having less than the minimum $1,000 sales in the year are also counted as farms if they could normally be expected to produce agricultural products in sufficient quantity to meet the requirements of the definition.

Sugarcane and soybeans are not the only crops that will benefit from the project. These are the crops most commonly grown in the watershed on both large and small farms alike and the "WITHOUT PROJECT CONDITION" yields for these two crops are shown for illustrative purposes. Benefits will accrue to crops other than soybeans and sugarcane on large and small farms alike.

Benefits are determined on a per acre basis with no distinction as to large or small farms. The operation and incomes of both small and large operators will change in

proportion to the size of the operating unit. The act provides that no structural measure (channel, in this case) will benefit a single landowner. Each channel in a watershed project must benefit more than one landowner to qualify for inclusion in the project.

No change made in EIS.

Comment No. 9: The impacts section (pages 117-123) makes considerable claims of benefits to minority groups, overall net farm income, and various other desirable social goals. The trend to larger farms as shown in the Draft EIS and outside sources of income utilized by those farming small acreages (page 91-92) appear to contradict many of these claims of widespread economic benefits due to the Lake Verret Watershed Project.

Response: The trend toward larger operating units is shown on page 64 as a problem in the watershed area and is not intended to be a consequence (impact) of the watershed project.

The discussion on pages 81 to 85 projects the economic and social impacts of the project. The project will help to improve management and production efficiency on all farms and even through it is recognized that the Lake Verret Watershed project will not stop the out migration of smaller operations, it will help to keep those landusers that are not operating on a marginal basis to remain on the farm. No claim was made that the project would reverse the trend, but rather it would slow the trend.

It is not intended that the impact section make "considerable claims of benefits to minority groups". The SCS's guidelines for preparation of environmental impact statements require that the impacts on minority groups and low income persons be shown. These data are presented as required under the "Economic and Social" heading of the IMPACTS section. No special emphasis is placed on the benefits accruing to minorities. In fact, it is stated on page 81 that the minority landusers will benefit to the same degree as nonminority landusers.

The Lake Verret Watershed will reduce restrictions to optimum production for those landusers in the areas. Projections do not indicate an increase in number of landusers.

No change made in EIS.

Comment No. 10: If all the information on small farms and lower categories of farms and lower categories of farm income is appropriate, then why not present data on maximum farm sizes and income? What would really be revealing is a rather large scale land ownership map showing location of project ditches. Could such a map be placed in the Final EIS. Also, could agricultural land and forested land and the land which will be cleared as a result of the proposed project also be delineated on this map?

Response: The distribution of farm sizes in the Watershed (as of the latest published information) is shown on page 40. An ownership map showing individual owners and the channel locations is available for use in the working file of the Soil Conservation Service in Alexandria. The document is too bulky to be included in the EIS, but is available in the SCS office should anyone be interested in this information.

Structural measures are located according to problem areas identified in the planning process by sponsors and other interested publics. They are not included or excluded because of size of farm or ownership. There is a restriction that a single landowner cannot be benefited by a structural measure.

A land use map is also available in the SCS office in Alexandria, Louisiana, for anyone who may be interested. A meaningful land use map is too bulky to include in the EIS.

The land that will be cleared as a result of the project is located within the rights-of-way of project channels. These areas are shown on the land use map in the SCS office. The induced clearing is located in scattered areas throughout the Watershed. The expected project-induced clearing is based on the following items of consideration: (1) location of forest land in relation to any particular P.L.-566 project channel; (2) soil association or soil capability class; (3) elevation; (4) ownership patterns; (5) local (SCS) knowledge of individual landowner's past performances. No landowners are contacted or involved in making these determinations. Therefore, these areas are not specifically located.

No change made in EIS.

Comment No. 11: Another interesting matter for inclusion in the Final EIS would be a comparison of the figures on future without project yields of sugarcane and

soybeans appearing on page 56 with the present statewide average yields for Louisiana.

Response: A comparison of future without watershed yields with present statewide yields is meaningless. The information on page 40 is referring to yields in the problem area of the Watershed, and no such information is available for the State as a whole.

No change made in EIS.

Comment No. 12: It is readily apparent that changes are needed in the Watershed Work Plan to prevent the clearing of 1,200 acres of forest land. Also, it is a highly questionable practice to provide benefits to 2,100 acres of land which are expected to be cleared with or without the project (page 95).

Response: The 1,200 acres of project-induced clearing is not a project planned action, but an anticipated one. The 2,100 acres projected as a result of past trends to be cleared will benefit from the projects and in accordance with USDA and SCS policy, it is within the authority of P.L.-566 to consider the benefits of improved drainage and reduced floods on this acreage.

No change made in EIS.

Comment No. 13: The claim on page 96 that "No project channel was designed for the purpose of providing increased flood protection and drainage on forest land" is highly suspect.

Response: The second sentence of the second paragraph on page 67 has been rewritten for clarity as follows: "Each project channel was designed only for the purpose of providing increased flood protection and drainage in open agricultural land or in residential or commercial areas."

Comment No. 14: The level of erosion control to be provided by the project appears to be grossly inadequate. Sheet erosion will continue to exceed 4 tons per acre with the proposed project. Greater attention should be given to conservation practices other than field ditching.

Response: Research has shown that land treatment measures do reduce erosion and sediment. In a report submitted to the President of the United States by the Secretary of Agriculture and the Director of the Office of Science and Technology in 1969, it was stated that "... proper land

management and erosion control measures is the most direct and usually the most satisfactory approach in dealing with most sediment problems... Such practices as mulching (crop residue management), stripcropping, and contour cultivation have been shown to be highly effective in reducing soil erosion on farmland."

In a paper presented to a National Conference on Conservation Tillage, W. H. Wischmeier showed that if 50% of the (soil) surface is covered, soil loss will be reduced to 32 percent of that with no mulch (crop residues) present.

Although land treatment measures do reduce erosion and sediment, land preparation for planting offsets some of this reduction. According to Control of Water Pollution from Cropland; "With the conventional practice of seeding crops on plowed and smoothed seedbeds, the soil has very little protection during the first two months after crop seeding. About 20 to 25 percent of the year's erosive rainfall normally occurs within this two month".

In addition, soil erosion is a process of both detachment and transportation and the reduction of either the detachment capacity or the transport capacity can limit soil loss. Both rainfall and runoff have detachment potential. Vegetative canopies reduce the impact of the raindrop on the soil surface, thus reducing the detachment of soil particles. Most crops (including sugarcane) produce canopy covers faster when adequate drainage is provided.

The P.L.-566 project structural measures will provide major outlets to farms. In order to provide the economic benefits, it is necessary to provide "onfarm drainage". The Soil Conservation Service technical guide provides that to adequately treat land, the conservation plan should: (1) maintain quality in the resource base; (2) maintain the quality in the standard of living, and (3) maintain the quality of the environment. Field ditching is one component part of the land treatment as are other practices to adequately treat the lands in the Lake Verret Watershed to meet the three requirements listed above. All practices needed to meet the three requirements will be given equal consideration in implementation of the land treatment program.

No change made in EIS.

Comment No. 15: Steps should be taken to prevent downstream effects on fisheries due to turbidity and pesticides originating in agricultural areas.

Response: Such steps are shown in the planned land treatment program outlined on pages 12 to 15 and lists practices that will result in decreases in sediment reaching downstream areas. Conservation practices such as crop residue management, wildlife upland and wetland habitat management maintain a soil cover and thus reduce erosion. Subsequently, turbidity and pesticides originating in these areas are reduced. No change made in EIS.

Comment No. 16: In addition, a more careful analysis of the social and economic effects of the Lake Verret Watershed seems in order. If benefits to minorities and economically disadvantaged individuals are major purpose of this project, than some specific plans to insure the desired effects should be included in the Final EIS and Watershed Work Plan.

Response: Providing benefits to minorities and economically disadvantaged individuals is not a "major purpose" of this project. The project purposes are watershed protection, flood prevention and drainage. The impacts (favorable or unfavorable) to these individuals must be assessed according to the SCS's "Guidelines for Preparing Environmental Impact Statements." The narrative on the economics and social effect is an analysis of the impacts the project will have on minorities and the economically disadvantaged. It is not within the scope of this plan to provide specific plans to insure these effects will take place. No change made in EIS.

Environmental Defense Fund

Comment: Initially, we would endorse the comments of the Wildlife Management Institute as set forth in that letter of October 21, 1977.

Response: None necessary.

Comment No. 1: The need for an Environmental Quality Plan. In addition, we assume, unless you advise us to the contrary, that this project is being planned and evaluated pursuant to the 1973 principles and standards of the U.S. Water Resource Council. Those standards require that an Environmental Quality Plan ("EQ Plan") be prepared, as well as a National Economic Development ("NED") plan. As part of an

NED plan, it is appropriate for the Soil Conservation Service to consider alternative ways of designing this watershed project with structural features so as to minimize adverse environmental effects. However, an EQ plan should be concerned with environmental restoration and improvement in environmental quality, not minimization of adverse environmental effects. From what we have been told about this project, we see little evidence that Soil Conservation Service has developed any kind of an EQ plan. Such a plan would necessarily entail reliance on non-structural measures, avoidance of destruction of bottomland hardwood forests and improvements in water quality. The EIS should describe in as much detail an EQ plan as any NED plan and alternatives.

Response: As stated in the Foreword at the beginning of the Planned Project section, Lake Verret Watershed was approved for operations by Congress on February 20, 1973. Also, an EIS was prepared and submitted to CEQ. Because of concern for environmental values by the SCS, other Federal, State, local agencies, and other interests in the project, the sponsoring local organizations requested the plan be supplemented to eliminate and minimize damages to important environmental factors. The revised EIS reflect the changes that were made.

Because of the status of this watershed work plan, the planning procedures and evaluations stipulated in the principles and standards of the U.S. Water Resources Council do not apply to the Lake Verret Watershed since the plan was prepared and approved prior to September 1973. No change made in EIS.

Comment No. 2: Arbitrary inclusions of NED benefits relating to sugar cane. The primary benefits, as we understand it, of this project are to increase the amount of acreage available for and the efficiency of production of sugar cane and soybeans in addition to other commodities. In part because of overproduction of sugar cane in the State of Louisiana and elsewhere, sugar cane growers in the State of Louisiana have been seeking and have successfully obtained subsidies and price supports from the U.S. Department of Agriculture in Washington, D.C. However, the real competition to the sugar cane growers in Louisiana comes not from foreign producers of sugar cane but from corn sugar which is produced in this country.

In view of this fact, we would like an explanation from you in the EIS as to how increased sugar cane production is considered consistent with National Economic Development. It would seem to us that, in view of present agricultural policies with respect to sugar cane, reduced production of sugar cane is consistent with National Economic Development. It is absurd to say that under all circumstances increased sugar cane production increases National Economic well-being.

Furthermore, nutritionists in this country are almost unanimous in the position that Americans consume too much sugar on a per capita basis. Sugar consumption per capita has riser significantly since World War II to the detriment of public health. Nutritionists agree that a decreased consumption per capita is in the national interest and would therefore be consistent with National Economic Development, not to mention Environmental Quality. We would like to know if you agree with this assessment, and if not, what nutritionists and public health experts you have sought opinions from who would disagree with this general assessment. We would be particularly interested in any USDA scientific findings supporting any claim that increases in per capita sugar consumption would benefit public health. If in fact decreased per capita sugar consumption of sugar is in the interest of public health in the country, we do not understand how you can claim economic benefits for increased production. Our view is that the benefits of increased sugar production are zero.

Furthermore, the country seems to be surfeited with soybeans and rice at the present time such that acreage restrictions may be imposed again and price supports are sought. Only foreign agricultural disasters may prevent this occurrence. With or without acreage restrictions, the EIS should identify the USDA national policies supporting increased farm acreage for production of soybeans and rice. In our opinion, increased acreage for production of these commodities is in conflict with national agricultural policy. What the country needs is preservation of forestland and wetlands, not more soybean land. For this reason, we consider the agricultural flood control benefits of the project to be zero.

Response: The primary purpose of this project is not to increase the amount of acreage available for crop production, but rather to increase the efficiency of production of crops; and to provide urban protection for the Town of Donaldsonville.

The following is an excerpt from a special memorandum for the Special Representative for Trade Negotiations from President Carter:

> "I have determined that import relief for sugar is not in the national economic interest. Import relief, achieved either through quotas or tariff increases would have an inflationary impact on the economy, raising prices to consumers without the promise of offsetting price stabilization benefits. "Import relief would be of questionable benefit to the domestic sugar industry, because it would encourage increased market penetration by substitute sweetners, particularly high fructose corn syrup, which can be provided at a lower cost than most U.S. sugar.
>
> "Finally, import relief would adversely affect the export earnings of a large number of developing countries which depend on sugar exports for their economic growth and prosperity.
>
> "I firmly believe that it is important to maintain a viable domestic sugar industry in this country. I have therefore requested the Secretary of Agriculture to institute an income support program for sugar producers, effective with the 1977 crop, offering supplemental payments of up to 2 cents per pound, whenever the market price falls beneath 13.5 cents a pound. Such a program will help cover the costs of production of U.S. sugar producers."

This memorandum says that domestic sugarcane production (Louisiana sugarcane production) is very important in National Economic Development.

Public Law-566 provides the legislation that allows the Soil Conservation Service to limit assistance on non-Federal lands to those measures which (a) are primarily for flood prevention (including land stabilization), drainage, irrigation, recreation, fish, and wildlife, municipal or industrial water supply, or other water management; (b) produce substantial benefits to groups of landowners, to communities, and to the general public; and (c) cannot generally be installed by individual

landowners or small groups of landowners with the aid of available ACP and other cost sharing. (Watershed Protection Handbook, Chapter 1, Sec. 101.01 4th para.)

The purposes of the Lake Verret Watershed are to provide watershed protection, flood prevention, and drainage to an existing openland area that has gone on record as having serious water and related land resource problems.

This project will not and is not required to dictate the utility function of the American people for sugar.

No change made in EIS.

Comment No. 3: <u>Need for cumulative impact assessment and program EIS</u>. As we understand it, your revised draft EIS looks at this watershed project in isolation from other projects in its drainage basin which have overlapping and inter-related secondary and cumulative impacts. This drainage project is designed to accelerate the drainage of floodwaters from bottomland hardwood forests and farmland. This will inevitably induce downstream flooding since the water must go somewhere. These changes in the rates and flows of downstream floodwaters should be carefully quantified and calculated. The area to the East and South of Morgan City, Louisiana, already faces severe flooding problems. It would seem to us that this project can only intensify those flood problems and increase flood stages in the areas to the South to which the flood waters would drain, whereas, the national interest, and certainly Morgan City's interest, lies in the direction of reducing potential flood hazards.

Furthermore, hydrologically and in terms of water management, this project must be viewed together with the Bayous Chene, Boeuf and Black navigation project and Corps of Engineers flood control plans for the backwater area of Western Terrebonne Parish and Morgan City east of the Lower Atchafalaya River, not to mention flood control and fish and wildlife programs throughout the Atchafalaya Basin. The Bayous Chene, Boeuf and Black navigation project to the East and South of Morgan City, through deepening and widening channels and reducing roughness coefficients, will increase water movement and accelerate drainage under different hydrologic conditions. It is imperative that you, together with other responsible agencies, consider the cumulative changes wrought by this proposed project, Bayous

Chene, Boeuf and Black, and proposals for flood control, such as the extension of the Avoca Island levee, on the entire flow regime of the Lake Verret Basin.

Response: The first sentence of the fifth paragraph on page 66 has been changed to read: "Excavation and clearing of project channels will cause decreased stages and shorter durations of flooding in benefited areas, and minor increases in stages immediately downstream from benefited areas (see page 70)." The statement on page 70 remains valid: "The combined effects of the Bayou Grosse Tete, Choctaw Bayou, and Lake Verret Watershed projects, as planned, were considered in determining the stage increases. No other anticipated projects that could possibly influence the stage effects are known at this time." The effects, on flood stages and volume of water available, of the projects mentioned in your comment will not be influenced by installation of the Lake Verret Watershed project measures.

Comment No. 4: The need to preserve bottomland hardwood forests. Similarly, this and numerous other proposed Soil Conservation Service projects in Louisiana and elsewhere in the southeast may result in the devastation of tens of thousands and perhaps hundreds of thousands, of acres of bottomland hardwood forests. Originally, this part of the country had some 20 million acres of bottomland hardwood forests. That number is now down to 5 million acres. This country can no longer afford to lose any more of this important renewable resource. The losses of bottomland hardwood forests which are discussed in your EIS can only be intelligently evaluated and assessed in the context of other projected bottomland hardwood losses from other public investments by the USDA and the Corps of Engineers and private drainage schemes.

Response: Between 1962 and 1971, approximately 49,000 acres of forest land was converted to cropland in a 9-parish area in the immediate vicinity of the watershed; an average of about 5,400 acres per year. In 1960, the average price received for soybeans was $2.00 per bushel; $2.41 per bushel in 1965; $2.87 per bushel in 1970; and $4.79 per bushel in 1975. This is an increase of over 200 percent since 1960, which provides the economic incentive for the large scale clearing of forest land. The watershed work plan has been supplemented to eliminate and minimize damages to bottomland hardwoods as much as possible. However, some damage is unavoidable. No change made in EIS.

Comment No. 5: Finally, it is imperative that the EIS disclose in detail the water quality impacts of this project. It is well-known that agricultural non-point source pollution constitutes a very serious and growing water pollution problem in the Lower Mississippi River Basin, the Atchafalaya Basin and all of coastal Louisiana. The most serious agricultural contaminants involved, in addition to excess sediments, are nutrients and toxic agricultural pollutants. It is not sufficient for the Soil Conservation Service to say that the EPA has responsibility, under various statutes, to control discharges of toxic pollutants or to prohibit the use of proven toxic or carcinogenic agricultural pesticides. The long-standing opposition of the USDA to efforts by EPA to control the use of toxic agricultural pesticides should be evidence enough that legislation on the books is not a guarantee that pollution, with concommitant public health problems, will not occur. Indeed, such a position is the very height of irresponsiblity.

In this EIS, the Soil Conservation Service should review existing data on agricultural pollutants, including toxic pollutants, and other river basins which have experienced this kind of drainage project. If you are having difficulty finding such data, please let us know. We would anticipate that increased loads of agricultural pollutants, with this project in place, would move more rapidly southward throughout the Verret and Western Terrebonne Parish water basins. This may very well imperil the quality of public water supplies. The cost of installing activated charcoal filters in public water supplies in order to abate pollution by agricultural pesticides should be carefully considered and quantified and included as a cost of the project.

Response: Water quality impacts are discussed on pages 78-81 of the EIS.

Sediment is the main pollutant on the basis of tonnage in the streams of the Lower Mississippi Basin, and it is the main carrier of other entities such as plant nutrients and pesticides. Sixty years ago, the Mississippi River was carrying 730 million tons of sediment to the Gulf during the average year (Bennett, Soil Conservation, McGraw Hill, 1939). During the 1930's the Mississippi carried an average of 475 million tons of sediment (Fippin, Soil Science 61:225, 1945). The Corps of

Engineers at Vicksburg find that the average annual sediment burden in the Mississippi during the 1960's was 350 million tons. The trend has certainly been downward, but it is doubtful that this sediment burden in the lower Mississippi can go much lower. During the 1930's the sediment in this river carried an annual average burden of 808,000 tons of nitrogen and 635,000 tons of P_2O_5 (See Fippin). These nutrients were deposited wherever the sediment was deposited. Although the burden of sediment in the Mississippi has dropped remarkably, it is doubtful that there has been any drop in the percentage of plant nutrients attached to the sediment particles.

Fifteen years ago, or even five years ago, sediment particles in the Mississippi were carrying traces of DDT and other chlorinated hydrocarbon pesticides. If there are any of these chemicals in a stream, they will be primarily absorbed on the surface of the suspended soil particles and not be dispersed in true solution (Monitoring Agricultural Pesticide Residues, Agr. Res. Serv. Pub. 81-32, 1969). Pesticide concentrations in runoff from watersheds in the Mississippi Delta area have been found to be directly related to sediment yields, since pesticide was absorbed on sediment. (Proc of the 3rd Federal Inter-agency Sedimentation Conf., 1976).

There is a very high volume of runoff from the Lake Verret Watershed - 26 inches during the average year. The nature of the soils dictate that all runoff is surface runoff; that is, these soils have poor infiltration capacity, poor hydraulic conductivity, high water tables, and no system for subsurface drainage. Thus, for any entity to be picked up by the runoff water, it would have to be on the soil surface. Average annual runoff means that six million pounds of water flows from each acre of soil over a year's time. For example, if such runoff picked up six pounds of nitrate-nitrogen from the soil surface, the concentration of nitrate-N on this runoff would be one part per million. All the evidence available for surface runoff indicates that picking up as much as six pounds of nitrate-N per acre per year is highly unlikely.

Since average annual runoff from the watershed is 520,000 acre feet, or 707 million tons of water; 442 tons of sodium nitrate containing 70.7 tons of nitrogen would have to be added to this volume of water to increase nitrate-nitrogen content by 0.1 ppm. The modest increase in use of chemical fertilizer - 150 tons - on the farm lands that is anticipated will incur an increase in nitrate nitrogen content in the annual runoff by less than 0.01 ppm. Experimental evidence shows that surface

runoff carries off only 2-5 percent of applied fertilizer nitrogen as nitrate-N.

Guthion is the main insecticide now being used on sugarcane to control borers. It is a nonpersistent organophosphorus compound that biodegrades relatively rapidly. Yet, 2-3 months may elapse before 90 percent of an application of this chemical is inactivated by decomposition. If a two-inch rain occurred one week after an application of 0.75 lbs. per acre of Guthion, 5-10 percent of the application might appear in the runoff water. Such a rain occurring over a 2-3 hour period could induce 1.2 inches of runoff amounting to 272,000 pounds of water carrying away 0.06 pounds of Guthion. Concentration of Guthion in runoff from a field would be 0.22 ppm. Runoff water from untreated areas in the watershed would dilute this concentration to 0.10 ppm. This level of Guthion in the drainage water could at times reach Lake Verret even though there were no project development. The five percent increase in rate of water transport from the cane fields to Lake Verret as result of project development would not incur a detectable increase in potential toxicity of Guthion at an inlet to the Lake.

Over 100 technical reports pertaining to the quality of water in river basins, watersheds, and drainage systems have been examined. Many of these studies have been made in arid and semi-arid regions where nitrate and soluble salts have naturally accumulated (Proc. First Int. Cong. Soil Sci. 4:483, 1927). The runoff from watersheds and drainage from farmlands in such regions often contains high levels of nitrate and very high levels of soluble salts (Soil Sci. Soc. Amer. Proc. 33:1711, 1969; Soil Sci. Soc. Amer. Proc. 29:287, 1965; Soil Sci. Soc. Amer. Proc. 33:575, 1969; Soil Sci. Soc. Amer. Proc. 35:331, 1971). These findings showing high salt and nitrate pollution are peculiar to arid regions and have no relevance to a humid area such as the Lake Verret Watershed.

There are many studies pertaining to the quality of water in the effluent from subsurface tile drains that are so prevalent in the Corn Belt States (J. Amer. Water Works Assn. 63:303, 1971; Mich. Agri. Exp. Sta. Res. Bul. 31, 1971; J. Envir. Qual. 3:183, 1974; Can J. Soil Sci. 50:275, 1970; Soil Sci. Soc. Amer. Proc. 36:134, 1972). These investigations on the quality of water in tile-line effluent are often found to be at pollution levels, particularly with respect to nitrate. Since there are no tile lines in the farm lands of the Lake Verret Watershed, and no other system for subsurface drainage, studies on the quality of tile effluent have no relevance to this watershed. All runoff is surface flow.

It is of interest to consider data on the quality of water in the surface runoff from excessively fertilized farm land in Iowa (J. Soil and Water Conserv. 32:226, 1977). The 74 acres were planted to corn continuously for five years and during each year chemical nitrogen fertilizer was added at the rate of 400 pounds of N per acre. Surface and subsurface runoff were collected separately and analyzed. There was an average of 1.12 pounds per acre per year of soluble nitrogen in the surface runoff. That is, 0.28 percent of this excessive application of N appeared as soluble N in the surface runoff. There was an annual average of 18.49 pounds per acre of soluble nitrogen in the subsurface runoff, i.e. 4.61% of the applied nitrogen appeared in the subsurface flow. An average of 59 pounds of fertilizer phosphorus per acre was added to this watershed each year, and there was found to be a loss of 0.13 pound of soluble P per acre per year in the surface runoff, and 0.04 pound of soluble P per acre per year in the subsurface flow. A comparable watershed at the same location received only 155 pounds of chemical nitrogen fertilizer per acre per year, and 36 pounds of fertilizer phosphorus per acre per year. Obviously, the amounts of soluble N and P in surface and subsurface runoffs were considerably lower than was found for the excessively fertilized watershed.

The plans on the Lake Verret Watershed indicate an increase in use of chemical fertilizer by 150 tons per year over the 46,000 acres of farm land receiving conservation treatment. If this amount of fertilizer was applied to only 2/3 of this land - 30,000 acres - the increase in fertilizer application would be 10 pounds per acre. If the fertilizer to be used were primarily anhydrous ammonia, there would be an increase in nitrogen fertilization of nine pounds per acre per year. Anhydrous ammonia has to be applied by injection down in the soil so that there is little opportunity for surface pick-up. Surface runoff is 26 inches per year, or a flow of six million pounds of water from each acre each year. Thus, the dilution effect is tremendous. Adding on additional 150 tons of chemical fertilizer to the farmlands of the watershed has the potential of increasing the amount of nitrate, ammonia and orthophosphate in the runoff water, but the consequent increase in the levels of these entities in the overflow from the watershed will be less than the analytical error that prevails in chemical laboratories.

It is recognized that pesticides are transported in agricultural runoff (J. Envir. Qual. 2:29, 1973; J. Envir. Qual. 2:463, 1973; J. Envir. Qual. 4:201, 1975). That which is not adequately recognized is that the trans-

ported pesticides are virtually all carried by having been absorbed on the surface of the transported sediment (Proc. 3rd Federal Inter-Agency Sedimentation Conference, Denver, 1976, 3-53).

The Soil Conservation Service reviewed existing data on agricultural pollutants in 1973 and found that very little information was available for assessing impacts of a drainage and flood prevention project of this type and under existing conditions. The SCS took leadership and set up a water quality monitoring program for this project at that time with other Federal and State agencies participating. Extensive sampling, including pesticide residue analysis in water, sediment, and fish tissue has been done. A pesticide usage survey has also been conducted to determine current usages of various compounds with total volume used in the project area.

Pesticide levels in sediments were monitored between July 1973 and August 1975 at five locations. A total of 29 samples were taken. Thirteen (45%) of the samples were negative for pesticides. The remaining 16 (55%) were positive; however, the residue levels were very low. Pesticide levels ranged from a low of .01 ppm DDE to .15 ppm Aldrin. The mean for the total 29 samples was .02 ppm. Total residues in the 29 samples was only .71 ppm.

Nineteen fish samples were taken during the same time period as the sediment samples at the Lake Verret station. No pesticides were detected in three of the samples (largemouth bass, bluegill, and striped mullet). Sixteen of the 19 samples were positive for one or more pesticides or metabolites. Levels of the positive samples ranged from .01 ppm to 1.6 ppm. The mean for the 19 samples was .22 ppm. Total residue of pesticides in the nineteen samples was 4.2 ppm. When residue levels in water, sediment, and fish tissue in Lake Verret are compared with the list of pesticides currently being used in the watershed (appendix H-6), it shows that none of the pesticides are currently reaching Lake Verret in detectable amounts. The pesticide residue sample results correlate directly with the current pesticide usage because the pesticides currently being used have a nonpersistent nature and fast degradation rates and are not showing up in the residue analysis. Chlorinated hydrocarbons, formerly used in the watershed, have a persistent nature and slow degradation rates, and are still showing up in the samples. If the current trend of using shorter life nonpersistent pesticides continues, it doesn't seem likely that pesticide levels will increase in Lake Verret as a result of this project. Two water samples have been taken from Lake Verret for pesticide

analysis. Both were negative. It does not seem necessary to install activated charcoal filters when current levels of agricultural pesticides are so low.

Even though the project has the objective of moving the excess water off the farmland following a deluge, this increased rate of water removal from the cultivated land will not appear as a significant increased rate of inflow into Lake Verret because construction will terminate in forested wetlands many miles upstream from the lake. The great expanse of wetlands forest that is encompassed by the watershed acts as capacitance to regulate flow. Non-agricultural land constitutes the major portion of the watershed. Pursuant to a deluge, the rate of water flow from the wetlands forests and associated nonagricultural lands will be the overriding determinant of rate of flow into Lake Verret.

Since the potential increase in agricultural chemicals in the main canals near their outlets will be below the level of detection, and the expanse of wetlands will modulate the flow, the quality of water will not be imperiled. The EIS has been modified to include the last two paragraphs of this response.

Comment No. 6: The mitigation plan. As we understand it from the Wildlife Management Institute letter, any "mitigation plan" which you have considered is clearly inadequate. Furthermore, we want you to understand that there is no way in which to mitigate this and similar Soil Conservation Service projects which are destroying the country's renewable resource base and its bottomland hardwood forests. Taken to its local extreme, even a one for one mitigation plan would mean that the country would be left with only 2½ of its remaining 5 million acres of bottomland hardwood forests. This is inexcusable.

Furthermore, we would hope that the U.S. Department of Interior would accelerate a program for acquisition of bottomland hardwood forests as perhaps the only technique to preserve them in the face of efforts by the Soil Conservation Service and other agencies to destroy them. This clear conflict in policy between federal acquisition programs designed to protect remaining bottomland hardwood forests and Soil Conservation Service efforts to drain and destroy them should be clearly articulated, explained and, if possible resolved in the EIS.

Response: The purpose of the EIS is not to articulate differences in Federal programs which appear in conflict. Also, it is not the purpose of the Lake Verret Project to drain or destroy wetlands and bottomland hardwoods. It will not provide flood protection to areas now in forest land downstream from the benefited area. When examined closely, there is no conflict in policy. In fact, the original plan has been supplemented to minimize adverse impacts on wetlands and bottomland hardwoods as much as possible without foregoing the favorable impacts of flood prevention and improving drainage on 93,516 acres of cropland and pastureland. We feel the EIS adequately portrays both the favorable and adverse impacts of the plan as supplemented. See response to Comment No. 2 of the U.S. Department of the Interior for further explanation of the planned mitigation area.

Dufour, Levy, Marx, Lucas & Osborne
Attorneys-At-Law

Comment No. 1: Significantly more attention needs to be given to the downstream impacts of the project, including the impacts on the receiving waters below the Watershed Project boundary. For example, you should attempt to quantify the increases in ammonia nitrogen, nitrate nitrogen, and orthophosphates which will occur in Lake Verret and the Lake Verret system. The Lake Verret system should be defined. The adverse effects should be fully described and quantified where possible. The amounts of agricultural chemicals which enter the waterways with and without the project should be quantified and the impacts assessed both within and without the project boundaries. More complete discussion of the problem of pesticide runoff is needed both in regard to its direct effects on water quality and the cumulative effect of pesticides in combination with the other pollutants that will be introduced into the downstream waters.

Response: The Lake Verret system is defined as the waters of Lake Verret, Grassy Lake, Lake Palourde, and the tributaries of these lakes.

Detailed information is not currently available to develop a water quality model for determining increases of nitrogen, nitrate nitrogen, and orthophosphate in Lake Verret as a result of the 150 tons annual increase of fertilizers. It is understandable at first glance the projected increase in use of chemical fertilizers by 150

tons per year on the farmlands of the Lake Verret watershed would cause concern. Cropland in the benefitted area amounts to 51,400 acres. However, only about 30,000 acres will receive the additional fertilizer. Applying 300,000 pounds - 150 tons - of fertilizer the 30,000 acres becomes an addition of 10 pounds per acre per year. If this increase in fertilization is applied primarily as gaseous ammonia that is injected down into the soil, there will be an additional nine pounds of fertilizer nitrogen added to the soil per acre per year with little opportunity for surface pickup. Average annual runoff is 26 inches, or six million pounds of water per year. All runoff is surface runoff since there is no facility for subsurface flow. If five percent of the added nitrogen were picked up by runoff - 0.45 pounds - then the concentration of nitrogen by the runoff would be increased by 0.075 ppm. Furthermore, the great mass of water coming in from other parts of the Watershed will proportionately dilute water flowing from the fertilized farm land. Experimental evidence indicates that surface runoff will not pick up even one percent of the added nitrogen.

A ton of nitrogen as chemical fertilizer was added to each acre of a watershed in Iowa continuously planted to corn over a five-year period in increments of 400 pounds per acre per year (J. Soil and Water Conserv. 34:226, 1977). Over this span of time, 5.62 lbs. of nitrate nitrogen and 2.84 pounds of ammonium nitrogen appeared in the surface runoff. Thus, 0.28 percent of the applied N appeared as nitrate and 0.14 percent as ammonia in the surface runoff under this excessively high rate of application. Over the five year period, 235 lbs. of phosphorus was added per acre as superphosphate and 9.17 percent of this applied phosphate appeared as soluble orthophosphate in the surface runoff over the five year period.

The foregoing data are presented to show why the potential increase in nitrate, ammonium, and superphosphate in the water flowing into Lake Verret from the watershed as a result of increased use of chemical fertilizers will be well within the analytical error that prevails within a chemical laboratory. Consequently, the small increase of plant nutrients that will be added to the farmland will have no detectable effect on the quality of water in Lake Verret.

A recent pesticide usage survey indicated that shorter life pesticides are currently being used.

Concern over pesticide runoff would have been a far more pressing issue ten years ago when chlorinated hydrocarbon pesticides were still being used abundantly. These persistent pesticides can still be detected in soils and sediment even though their use has been discontinued for several years. Certainly pesticides are transported in agricultural runoff (J. Envir. Qual. 2:29, 1973; J. Envir. Qual. 2:463, 1973; J. Envir. Qual. 4:201, 1975). However, most of these pesticides are transported directly with the sediment since they are adsorbed on the surface of sediment particles (Proc. of the 3rd Federal Interagency Sedimentation Conf. Denver, 1976: 3053). Chemical analyses of clarified (suspended particles removed) samples of water taken in 1974 from waterways in the watershed revealed no detectable levels of pesticides in the water samples.

Guthion is the main insecticide now being used on sugarcane to control borers. It is a nonpersistent organophosphorus compound that biodegrades relatively rapidly. Yet 2-3 months may elapse before 90 percent of an application of this chemical is inactivated by decomposition. If a two-inch rain occurred one week after an application of 0.75 lbs. per acre of Guthion, 5-10 percent of the application might appear in the runoff water. Such a rain occurring over a 2-3 hour period could induce 1.2 inches of runoff amounting to 272,000 pounds of water carrying away 0.06 pounds of Guthion. Concentration of Guthion in runoff from a field would be 0.22 ppm. Runoff water from untreated areas in the watershed would dilute this concentration to 0.10 ppm. This level of Guthion in the drainage water could at times reach Lake Verret even though there were no project development. The five percent increase in rate of water transport from the cane fields to Lake Verret as a result of project development would not incur a detectable increase in potential toxicity of Guthion at an inlet to the Lake.

There will be no detectable increase of pollutants in waters of the lakes as a result of developing the watershed. The EIS on page 80 states that any possible increase in pesticides will occur in the larger bayous near agricultural areas.

No change made in EIS.

Comment No. 2: At various places in the statement you refer to land treatment measures both in the context of land treatment measures being previously applied and projected land treatment measures. The land treatment measures are not adequately described in either

the context of past or future applications. Your presumption as to future land treatment measures appears to have no basis or justification on a historical basis. You should set forth in a definitive manner the justification for making the projections as to future land treatment measures with the project.

Response: Past application of the land treatment program in Lake Verret Watershed is described on page 12 of the Environmental Impact Statement. In four years, 35 percent of the planned land treatment program has been installed without the construction of additional outlets for onfarm drainage systems. With an additional 168 miles of adequate outlets, resulting from project structural measures, it is reasonable to assume that the landusers will install the remaining 65 percent of the land treatment program during the remaining ten years of installation period.

The basis for this presumption is substantiated by the fact that of the 38 watersheds in Louisiana that have been approved for operation in the last 18 years, the planned land treatment program has been completely installed on 13. More than 75 percent of the planned land treatment program has been installed on another five. The remaining 20 have either been approved for operation recently or installation of structural measures has been delayed pending the preparation of Environmental Impact Statements. The fourth paragraph on page 15 has been changed to include the above narrative.

Comment No. 3: With regard to your section dealing with economics, the statement displays a distinct prejudice towards finding benefits. A more objective approach is required in the final document. Some of the dollar figures that you give appear to be readily susceptible to calculation where others such as the figure of $45,000.00 for improved quality of farm products at page 96 and the claim of $129,400.00 for more intensive use of cropland at page 96 and 97 seem to be more speculative. You should distinguish between firm figures and speculative figures and give the basis for your calculation. Again, a measure of objectivity and candor is required but is not reflected in the draft document.

Response: The $45,000 referenced here is not shown as a project benefit, but is an estimate of the differences in prices received because of the improved quality of the commodity resulting from better drainage and reduced flooding. This amount is used as part of the determination to

arrive at total value of commodities with the project installed. The $45,000 figure is considered realistic and firm since the determination of the difference in prices received under with project conditions and without project conditions because of improved quality of commodity is less than $.05 per ton of sugarcane and $.02 per bushel of soybeans. The basis for the more intensive land use benefits is not speculative and is explained on page 68 of the IMPACTS section of the EIS.

No change made in EIS.

Comment No. 4: All projections as to future actions should have their bases clearly stated. For example your projection at page 94 of 9,000 acres of agricultural land and 400 acres of forest land being converted to industrial use requires an explanation of how these figures were determined. Your projections as to future sediment loads going to Lake Verret need further explanation.

Response: The projection of 9,400 acres to go into industrial development is based on industrial ownership in the watershed area and limited interviews with locally knowledgeable individuals.

No change made in EIS.

The third paragraph on page 31 in the SETTING gives a breakdown describing the present amounts of sediment being deposited at different areas within the watershed. These figures are based on measurements of sediment and computations of erosion rates. There is no reason to anticipate major differences in sedimentation patterns after the project is installed. Projections on sediment reductions are based on reductions in erosion as a result of land treatment measures to be installed. Downstream sedimentation patterns will not be affected by the project. No change made in EIS.

Comment No. 5: The portions of the Environmental Impact Statement dealing with fisheries and wildlife losses requires further elaboration and quantification where possible. For example, at page 107, the impact on the crayfish resources is not assessed.

Response: The following is quoted from the last paragraph page 78 of the draft EIS. "During the construction phase a lowering of water quality will occur as a result of increases in turbidity and suspended solids. Out-of-bank flooding occurred during the construction phase, it would introduce this water into the habitat areas of the craw-

fish. Also, the reduction in out-of-bank flooding in localized areas could also have minor impacts on the crawfish resource."

Comment No. 6: The section of the statement dealing with alteration requires elaboration. Emphasis should be given in the final document to a wide range of non-structural alternatives.

Response: The planned project selected by the sponsors is given detailed explanation in the EIS. The other five alternatives and three alternatives within one of these, are given adequate explanation in the <u>ALTERNATIVES</u> section. These alternatives include both structural and non-structural and represent the widest range that could viably be implemented.

Comment No. 7: The final document should describe other Soil Conservation Service small watershed projects in the area and give the cumulative impact of these projects.

Response: The following has been inserted as the second paragraph on page 26. "There are two other operational P.L.-566 watershed projects that are hydrologically associated with the Lake Verret Watershed - Bayou Grosse Tete and Choctaw Bayou. Both are located to the north in either Pointe Coupee or West Baton Rouge Parishes. The outlet for the Bayou Grosse Tete Watershed is Bayou Grosse Tete which drains into Lower Grand River. The outlet for the Choctaw Bayou Watershed is Choctaw Bayou which empties into the Intracoastal Waterway southwest of Port Allen, Louisiana."

The cumulative downstream stages with projects installed are discussed and shown in tabular form on page 70.

Comment No. 8: The final document should also attempt to describe the various other public and private water resource projects in the area and assess the cumulative impact of these projects as well as discussing the Lake Verret project in relationship to the changing conditions in the Atchafalaya Floodway, the proposed Atchafalaya Center Channel Project, and other agency projects such as the Corps of Engineers Atchafalaya, Chene, Boeuf, and Black Project to the south of the Lake Verret Watershed Project.

Response: A comprehensive multi-purpose plan for the Atchafalaya Basin Floodway Project is currently being developed by the U.S. Army Corps of Engineer. Study efforts in the

area affected by the proposed Lake Verret watershed project are limited to investigations of backwater flooding in the area east of the Atchafalaya Basin Floodway, and to the investigation of measures for the diversion of flows to the area from the Atchafalaya Basin Floodway for fish and wildlife, recreation, and other purposes. The proposed watershed project would not foreclose any options for accomplishing these purposes. The Atchafalaya River and Bayou Chene, Boeuf, and Black Navigation Project will provide a waterway to afford transportation for large offshore drilling equpipment being built by industries in the area and for personnel and equipment serving offshore drilling operations. Construction is complete on the bay and Gulf reaches. Plans and specifications for the reach from Black Bayou to Bayou Chene are completed. Also, an Environmental Impact Statement has been prepared.

The planned hydraulic functioning of the Lake Verret Watershed project does not depend on the above mentioned navigation project.

These have been included in the Project of Other Agencies section of the EIS.

The combined affects of the Bayou Grosse Tete, Choctaw Bayou, and Lake Verret watershed projects, as planned, were considered in determining the stage increases downstream for channel work (see pages 70 through 72). No other anticipated projects that could possibly influence the stage affects are known at this time. No change made in EIS.

Comment No. 9: The relationship to the Lake Verret project to the plans and proposals of local government should be analysed and discussed. Reference should be made to the major studies and surveys of which you are aware which relate to water resource and environmental problems in the area which includes the area of the Lake Verret Watershed Project.

Response: Studies of other agencies are included in Projects of Other Agencies section, pages 52 and 53. The SCS has no knowledge of any local government proposals that would effect the Lake Verret Watershed plan.

Comment No. 10: The downstream flooding problem should be considered in the final statement. Particular attention should be given to the existing backwater and other flood problems in the Gibson, Amelia, and Morgan City areas and the increasing flood problem due to siltation in the lower Atchafalaya.

Response: A study, initiated by the U.S. Army Corps of Engineers in 1974, of the flood problems that includes the area mentioned here is discussed on pages 51 and 52 in the Project of Other Agencies section.

These areas have been given attention with respect to the effect that implementation of project measures in the Lake Verret Watershed will have on project-induced downstream flooding. This study is summarized in tabular form on page 70.

No change made in EIS.

APPENDIXES

Approved by: Alton Mangum
Alton Mangum
State Conservationist

Date: April 17, 1978

APPENDIX A

COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES

Lake Verret Watershed, Louisiana

(Dollars)

Evaluation Unit	Average Annual Benefits					Total	Average Annual Cost 3/	Benefit Cost Ratio
	Damage Reduction 1/	More Intensive Land Use 1/	Drainage 1/	Redevelopment 2/	Secondary 1/			
I	51,600	10,400	46,900	1,100	11,500	121,500	9,300	13.1:1
II	71,500	14,500	65,000	1,900	16,200	169,100	14,200	11.9:1
III	13,200	2,600	12,000	500	3,300	31,600	3,700	8.5:1
IV	30,900	6,200	28,100	600	6,500	72,300	6,100	11.9:1
V	78,600	15,900	71,500	1,900	18,900	186,800	17,200	10.9:1
VI	87,200	17,600	79,300	5,200	21,100	210,400	51,300	4.1:1
VII	132,800	26,800	120,700	9,300	37,700	327,300	88,000	3.7:1
VIII	41,800	8,400	38,000	2,400	8,400	99,000	23,000	4.3:1
IX	48,000	9,700	43,600	3,100	10,100	114,500	26,700	4.3:1
X	81,400	16,400	74,000	10,300	18,800	200,900	90,600	2.2:1
XI	4,100	900	3,700	600	600	9,900	5,400	1.8:1
Urban 2/	44,000	-	-	2,900	4,100	51,000	30,100	1.7:1
Project Administration	xxx	xxx	xxx	xxx	xxx	xxx	30,000	xxx
GRAND TOTAL	685,100	129,400	582,800	39,800	157,200	1,594,300	395,600	4.0:1

1/ Price base: Current normalized prices, December 1975; except residential.
2/ Price base: 1976 prices.
3/ Price base: Installation cost - 1976 prices amortized for 50 years at 5.5 percent; operation and maintenance cost-1976 prices.

January 1978

APPENDIX B

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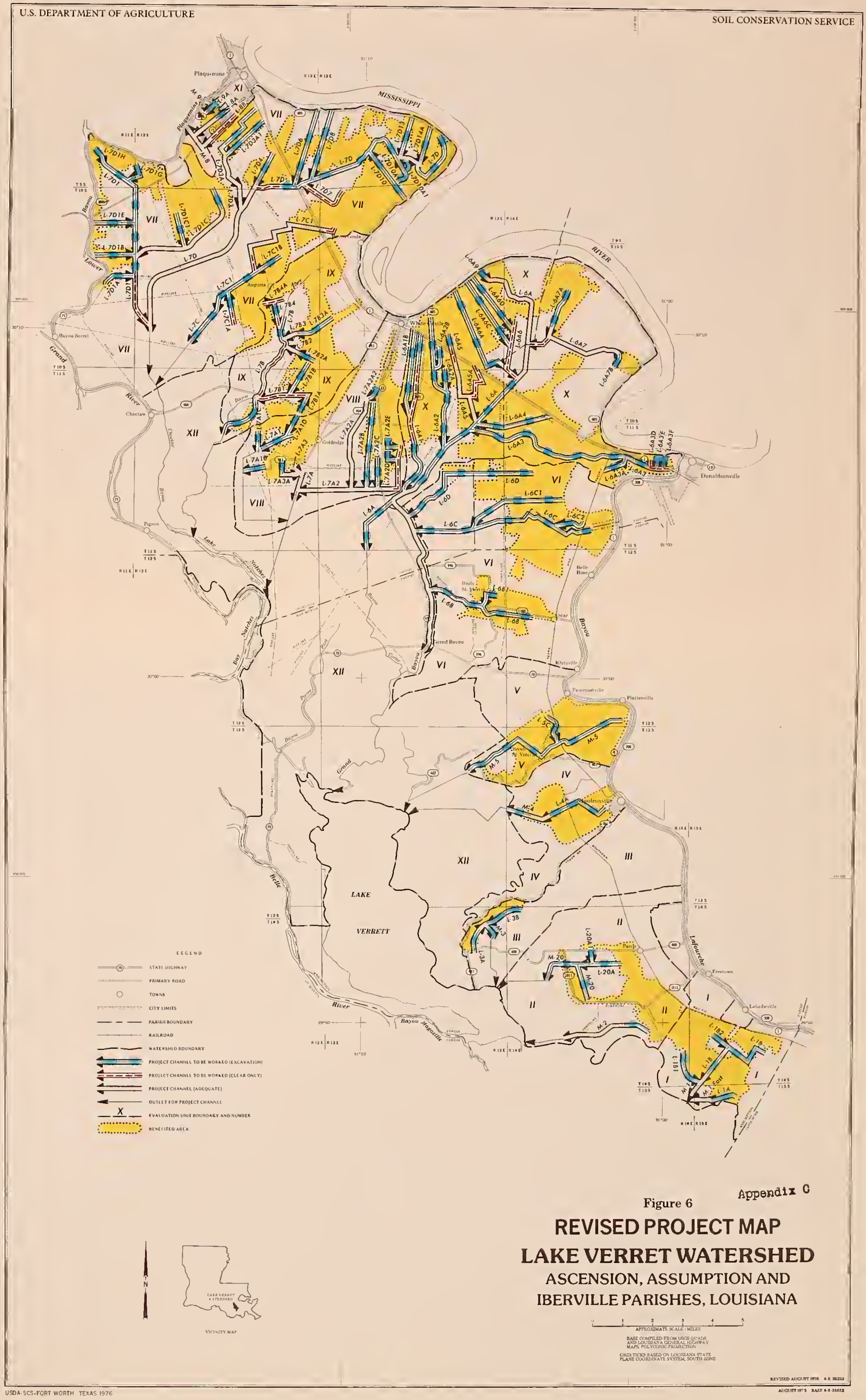


Appendix C

Figure 6

REVISED PROJECT MAP
LAKE VERRET WATERSHED
ASCENSION, ASSUMPTION AND IBERVILLE PARISHES, LOUISIANA

APPENDIX D

Common and Scientific Names of Plants and Animals In The Lake Verret Watershed[a/]

TREES

Baldcypress
Taxodium distichum

Bitter pecan
Carya aquatica

Black willow
Salix nigra

Boxelder
Acer negundo

Green ash
Fraxinus pennsylvanica

Hickory
Carya sp.

Honeylocust
Gleditsia aquatica

Live oak
Quercus virginiana

Nuttall oak
Quercus nuttallii

Red maple (Drummond)
Acer drummondii

Sugarberry (Hackberry)
Celtis laevigata

Swamp dogwood
Cornus drummondii

Sweetgum
Liquidambar styraciflua

Sweet pecan
Carya illinoensis

Water oak
Quercus nigra

Water tupelo
Nyssa aquatica

Willow oak
Quercus phellos

Overcup oak
Quercus lyrata

GRASSES, FORBS, AND AQUATICS

Aster
Aster spp.

Bermudagrass
Cynodon dactylon

Bluestems
Andropogon spp.

Carpetgrass
Axonopus affinis

Cocklebur
Zanthium stumarium

Cyperus
Cyperuss supp.

Clover
Trifolium spp.

Crabgrass
Digitaria sanguinalis

[a/] Not a complete listing.

Grasses, Forbs, and Aquatics (contd.)

Dallisgrass
Paspalum dilatatum

Duckweed
Lemna sp.

Fall panicum
Panicum dichotomiflorum

Fescue
Festuca arundinacea

Foxtail
Setaria sp.

Frogbit
Limncbium spongia

Giant ragweed
Ambrosia trifida

Giant cutgrass
Zizaniopsis miliacea

Goldenrod
Solidago sp.

Horned beakbrush
Rhynchospora comiculata

Lizardtail
Saururus cernuus

Palmetto
Sabal minor

Pennywort
Hydrocotyle sp.

Pluchea
Pluchea purpurascens

Sedges
Carex spp.

Smartweed
Polygonum spp.

Spikerush
Eleacharis sp.

Switchgrass
Panicum virgatum

Vaseygrass
Paspalum urvillei

Waterhyacinth
Eichhornia crassipes

SHRUBS AND VINES

Alabama supplejack
Berchemia scandens

Blackberry
Rubus spp.

Buttonbush
Cephalanthus occidentalis

Dewberry
Rubus spp.

Greenbrier
Smilax spp.

Honeysuckle
Lonicera japonica

Rattlebox
Daubentonia texana

Trumpetcreeper
Campsis radicans

Waxmyrtle
Myrica cevifera

Fern
Athyrium sp.

Hawthorn
Crategus marshalli

Peppervine
Ampelopsis arborea

BIRDS

Bachman's warbler
Vermivora bachmanii

Barred owl
Strix varia

Belted kingfisher
Megaceryle alcyon

Blue jay
Cyanocitta cristata

Blue-winged teal
Anas discors

Bobwhite quail
Colinus virginianus

Brown pelican
Pelecanus occidentalis

Brown thrasher
Toxostoma rufum

Common crow
Corvus brachyrhynchos

Eastern bluebird
Sialia sialis

Eastern meadowlark
Sturnella magna

Gadwall
Anas strepera

Great-blue heron
Ardea herodias

House sparrow
Passer domesticus

Ivory-billed woodpecker
Campephilus principalis

Little-blue heron
Florida caerulea

Louisiana heron
Hydranassa tricolor

Mallard
Anas platyrhynchos

Marsh hawk
Circus eyaneus

Mourning dove
Zenaidura macroura

Mockingbird
Mimus polyglottos

Peregrine falcon
Falco peregrinus

Pileated woodpecker
Dryocopus pileatus

Pintail
Anas acuta

Red-headed woodpecker
Melanerpes erythrocephalus

Red-shouldered hawk
Buteo lineatus

Red-tailed hawk
Buteo jamaicensis

Southern bald eagle
Haliaeetus leucocephalus

Sparrow hawk
Falco sparverius

Wood duck
Aix sponsa

Wild turkey
Meleagris gallopavo

AMPHIBIANS

Bullfrog
Rana catesbeiana

Bronze frog
Rana clamitans

Central dusky salamander
Desmognathus fuscus

Dwarf salamander
Manculus quadridigitatus

Fowler's toad
Bufo woodhousei fowleri

Green treefrog
Hyla cinerea

Marbled salamander
Ambystoma opacum

Northern spring peeper
Hyla crucifer crucifer

Southern leopard frog
Rana pipiens sphenocephala

Southern cricket frog
Acris gryllus gryllus

Three-toed amphiuma
Amphiuma means tridactylum

REPTILES

American alligator
Alligator mississipiensis

Broad-banded water snake
Natrix sipedon confluens

Canebrake rattlesnake
Crotalus horridus atricaudatus

Common snapping turtle
Chelydra serpentina

Diamond-backed water snake
Natrix rhombifera

Eastern garter snake
Thamnophis sirtalis sirtalis

Glossy water snake
Natrix vigida

Gray rat snake
Elaphe obsoleta spiloides

Green water snake
Natrix cyclopion

Ground skink
Lygosoma laterale

Mississippi mud turtle
Kinosternon subrubrum

Red-eared turtle
Pseudemys scripta elegans

Smooth softshell turtle
Trionyx muticus

Southern copperhead
Agkistrodon contortrix contortrix

Speckled kingsnake
Lampropeltis getulus holbrooki

Stinkpot turtle
Sternothaerus odoratus

Western cottonmouth
Agkistrodon piscivorous leucostoma

Western mud snake
Farancia abacura reinwardti

MAMMALS

Black Bear
Ursus amercianus

Bobcat
Lynx rufus

Cotton rat
Signodon hispidus

Cottontail rabbit
Sylvilagus floridanus

Eastern wood rat
Neotoma floridana

Fox squirrel
Sciurus niger

Fulvous harvest mouse
Reithrodontomys fulvescens

Gray fox
Urocyon cinereoargenteus

Gray squirrel
Sciurus carolinensis

Marsh rice rat
Oryzomys palustris

Mink
Mustela vison

Muskrat
Ondatra zibethicus

Nine-banded armadillo
Dasypus novemcinctus

Nutria
Myocastor coypus

Oppossum
Didelphis virginiana

Raccoon
Procyon lotor

Red bat
Lasiurus borealis

Striped skunk
Mephitis mephitis

Swamp rabbit
Sylvilagus aquaticus

White-tailed deer
Odocoileus virginianus

FISHES

Black bullhead
Ictalurus melas

Blue catfish
Ictalurus furcatus

Bluegill
Lepomis macrochirus

Bowfin
Amia calva

Carp
Cyprinus carpio

Chain pickerel
Esox niger

Green sunfish
Lepomis cyanellus

Hogchoker
Trinectes maculatus

Largemouth bass
Micropterus salmoides

Longear sunfish
Lepomis megalotis

Mississippi Silverside
Menidia audens

Redear sunfish
Lepomis microlophus

Fishes (contd.)

Channel catfish
Ictalurus punctatus

Freshwater drum
Aplodinotus grunniens

Flier
Centrarchus macropterus

Gizzard shad
Dorosoma cepedianum

Smallmouth buffalo
Ictiobus bubalus

Spotted gar
Lepisosteus oculatus

Spotted sunfish
Lepomis punctatus

Striped mullet
Mugil cephalus

Warmouth
Lepomis gulosus

White crappie
Pomoxis annularis

Yellow bullhead
Ictalurus natalis

INVERTEBRATES*

Ascellus sp.	(aquatic sowbug)
Hyallela azteca	(scud)
Gammarus species A	(scud)
Gammarus species B	(scud)
Cragonyx sp.	(scud)
Palaemonetes paludosus	(grass shrimp)
Palaemonetes kadiahensis	(grass shrimp)
Taphromysis louisianae	(mysid)
Crayfish	
Corixidae	(water boatman)
Erythrodiplax	(Dragonfly larvae)
Physa	(snail)
Cragonyx sp.	(scud)
Caenis	(may fly)

*Source: Final Supplement to the Final Environmental Statement Atchafalaya River and Bayous Chene, Boeuf, and Black - U.S. Army Corps of Engineers.

PHYTOPLANKTON

Sampling Date		Dominant Genera	Algal Units Per ml
03/21/74	1.	Pennate diatom	4,541
	2.	Flagellates	1,904
	3.	*Ankistrodesmus*	1,099
	4.	*Scenedesmus*	879
	5.	*Lyngbya*	366
		Other genera	623
		Total	9,412
05/29/74	1.	*Oscillatoria*	93,324
	2.	*Dactylococcopsis*	17,742
	3.	*Anabaenopsis*	4,436
	4.	*Nitzschia*	3,283
	5.	*Ankistrodesmus*	2,306
		Other genera	13,129
		Total	134,220
08/21/74	1.	*Oscillatoria*	68,499
	2.	*Lyngbya*	20,338
	3.	*Raphidiopsis*	9,600
	4.	*Anabaenopsis*	4,882
	5.	Centric diatom	3,091
		Other genera	19,198
		Total	125,608

Source: From EPA National Eutrophication Survey

Chene, Boeuf, and Black Plankton*

	Avoca Island Lake East Shore	Avoca Island Lake Central and West Areas	Bayou Chene About 4 Miles West of GIWW	Bayou Chene and Bayou Penchant
Cladocera				
Simocephalus exospinosus	xx	x	xx	xx
Sida crystallina	x			
Daphnia sp.	x	x	x	x
Diaphanosoma brachyurum	x	x		
Chydorus spaericus	x		x	x
Bosmina sp.		x	x	x
Ceriodaphnia reticulata		x		x
Copepod				
Osphranticum labronectum	xxx	xx	xx	x
Eurytemora affinis	xxx	xx	xxx	xxx
Diaptomus sp.	xx	xx	xxx	xxx
Macrocyclops albidus	xxx	xx	xxx	xx
Macrocyclops ater	xxx			
Mesocyclops edax		xx		
Eucyclops agilis			x	
Cyclops bicuspidatus thomasi			xx	x
Cyclops vernalis			x	x
Calanoid copepodids	xxx	xx	xx	xx
Cyclopoid copepodids	xxx	xx	xx	xx
Copepods nauplius		xxx		
Ostoracoda		x		x
Amphipoda				
Cragonyx sp.	x		xx	xx
Hyallela azteca		x		xx
Decapoda				
Callinectes sapidus - mega.			x	
Macrobrachium ohione	x			
Hydracarina			x	
Ephemeroptera				
Caenis			x	x
Odonata				
Enallagma	x			x
Anomalagrion	x			
Diptera				
Tendipedidae pupa	x			
Pentaneura				x
Pelecypoda (juv.)	x			
Gastropoda				
Physa				x
Rotifera				
Keratella		xx		
Chlorophyta				
Volvox				x
Spermatophyta				
Wolffia columbiana			x	
Osteichthyes				
Heterandria formosa	x			
Total number taxa	19	16	18	21

x - occasional
xx - common
xxx - abundant

*Source: U.S. Army Corps of Engineers Final Supplement to the Final Environmental Statement, Atchafalaya River, and Bayous Chene, Boeuf, and Black.

APPENDIX E

Figures 1 - 5

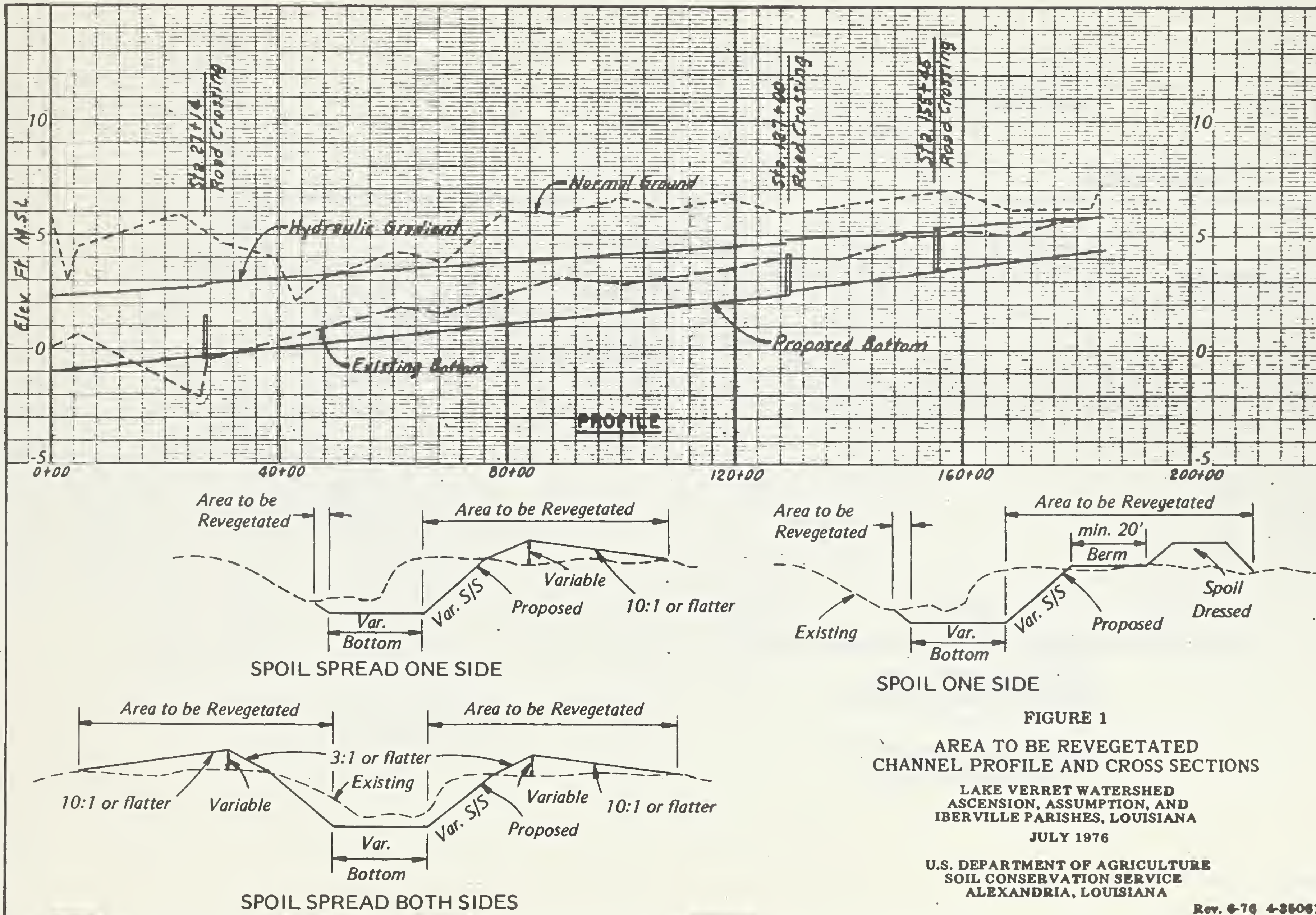


FIGURE 1

AREA TO BE REVEGETATED
CHANNEL PROFILE AND CROSS SECTIONS

LAKE VERRET WATERSHED
ASCENSION, ASSUMPTION, AND
IBERVILLE PARISHES, LOUISIANA

JULY 1976

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ALEXANDRIA, LOUISIANA

Rev. 6-76 4-35061

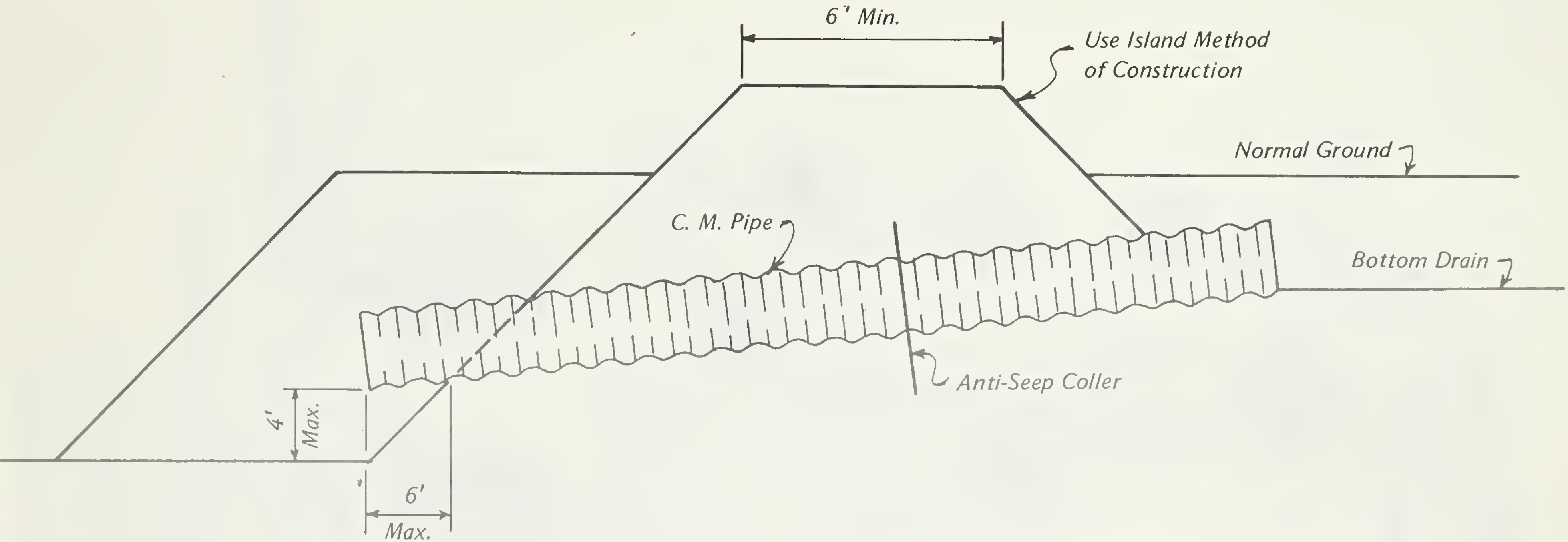


FIGURE 2

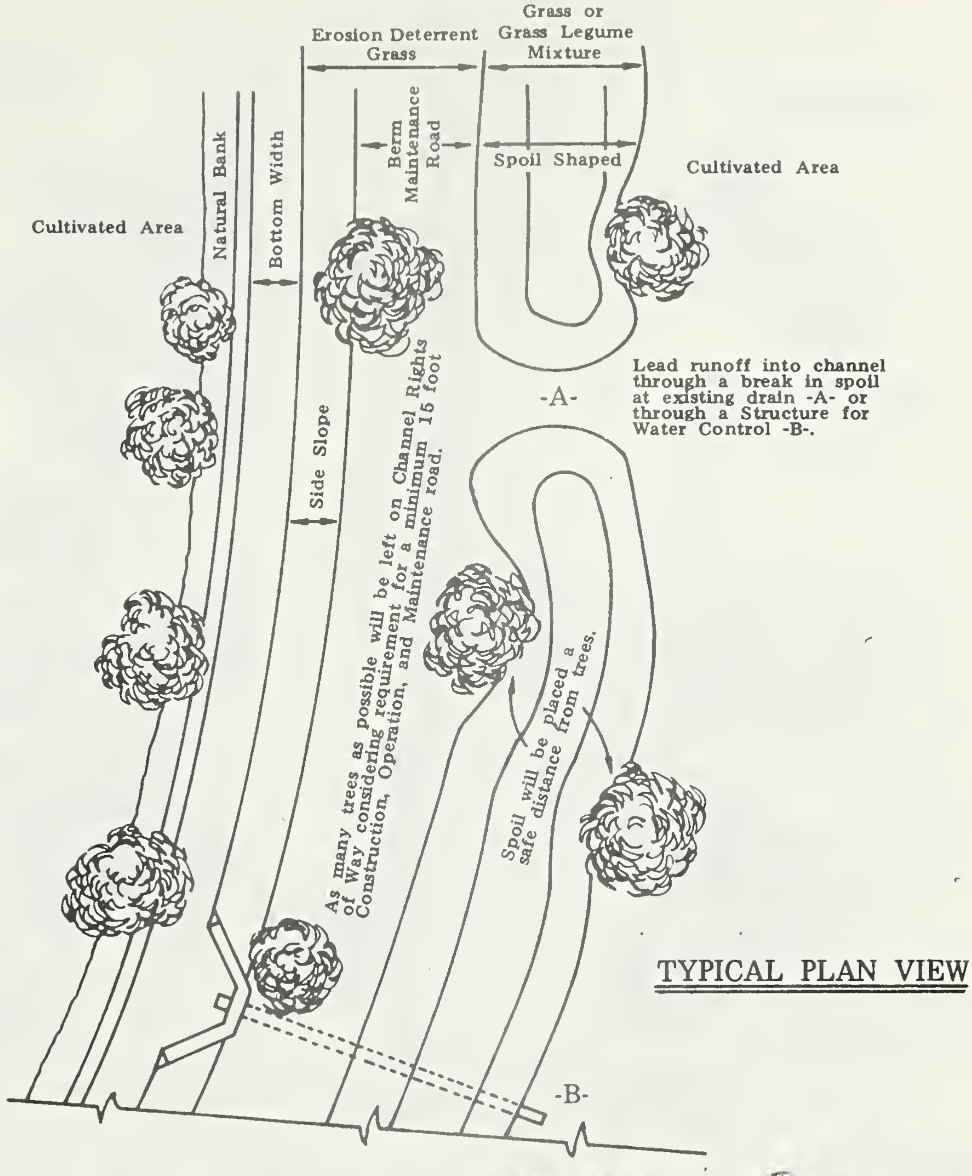
TYPICAL STRUCTURE FOR WATER CONTROL (PIPE DROP)

LAKE VERRET WATERSHED
ASCENSION, ASSUMPTION, AND
IBERVILLE PARISHES, LOUISIANA

JULY 1976

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ALEXANDRIA, LOUISIANA

Rev. 6-76 4-35062



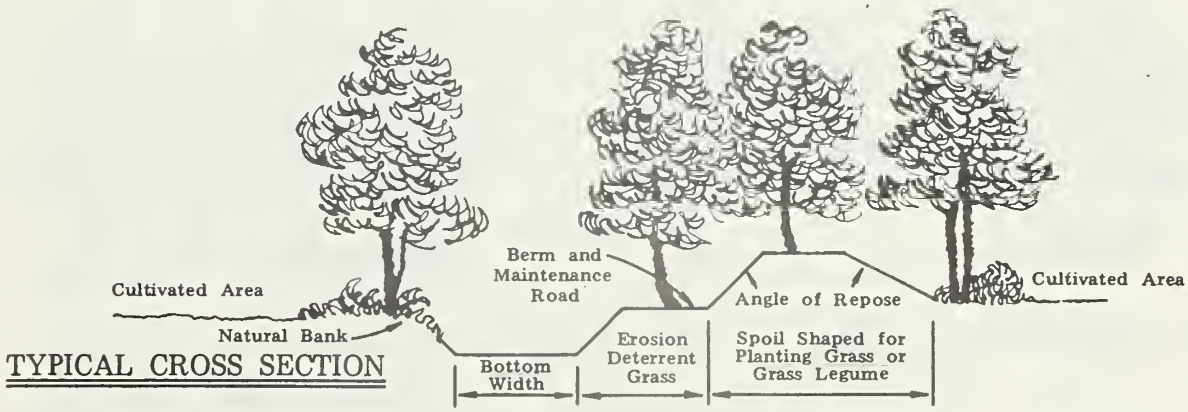


FIGURE 3

TYPICAL PLAN VIEW AND CROSS SECTION OF CHANNELS WHERE WOODY VEGETATION EXISTS ADJACENT TO CULTIVATED AREA

LAKE VERRET WATERSHED
ASCENSION, ASSUMPTION, AND
IBERVILLE PARISHES, LOUISIANA

JULY 1976

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ALEXANDRIA, LOUISIANA

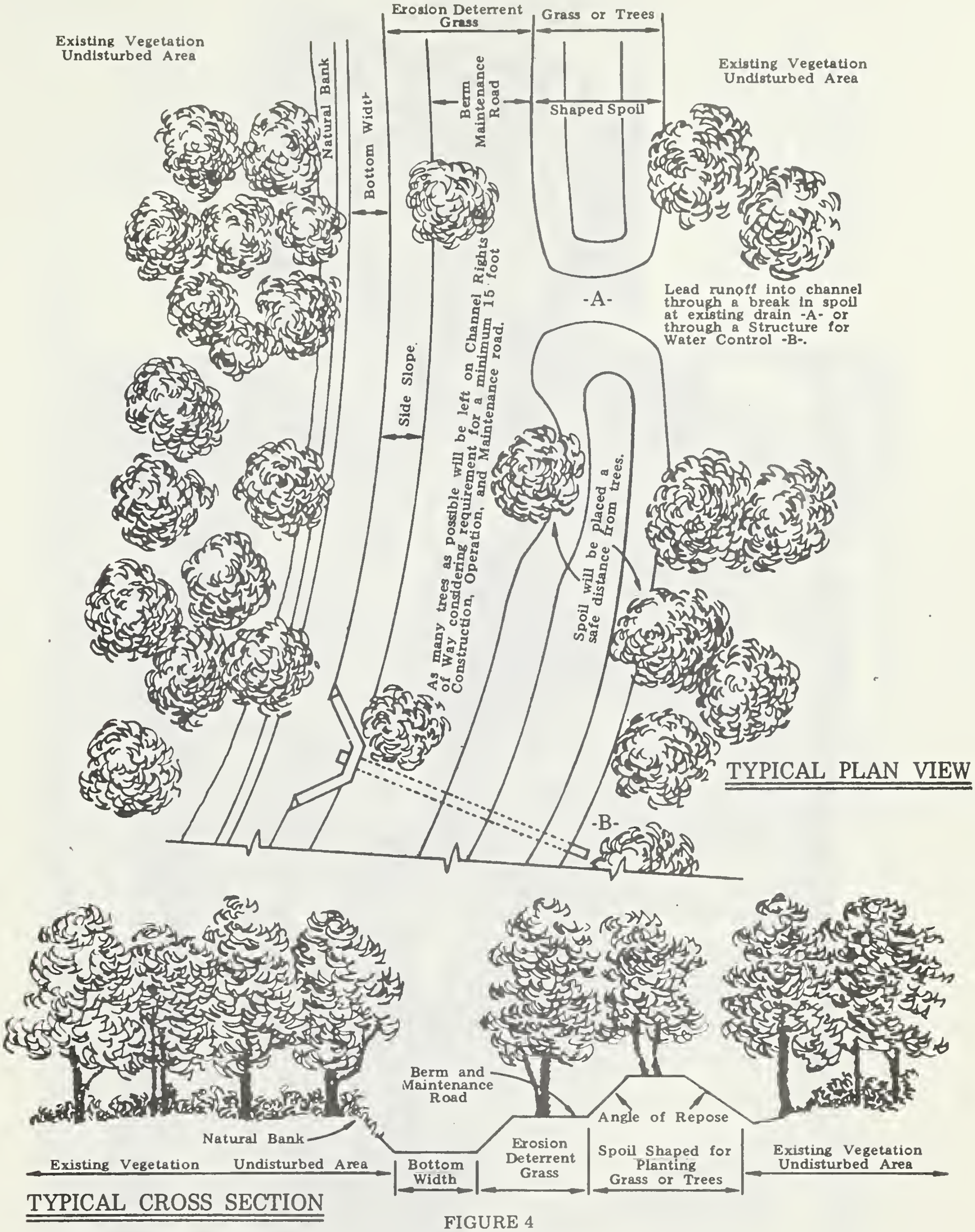


FIGURE 4

TYPICAL PLAN VIEW AND CROSS SECTION OF CHANNELS THROUGH FOREST LAND

LAKE VERRET WATERSHED
ASCENSION, ASSUMPTION, AND
IBERVILLE PARISHES, LOUISIANA

JULY 1976

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ALEXANDRIA, LOUISIANA

Rev. 6-76 4-35066

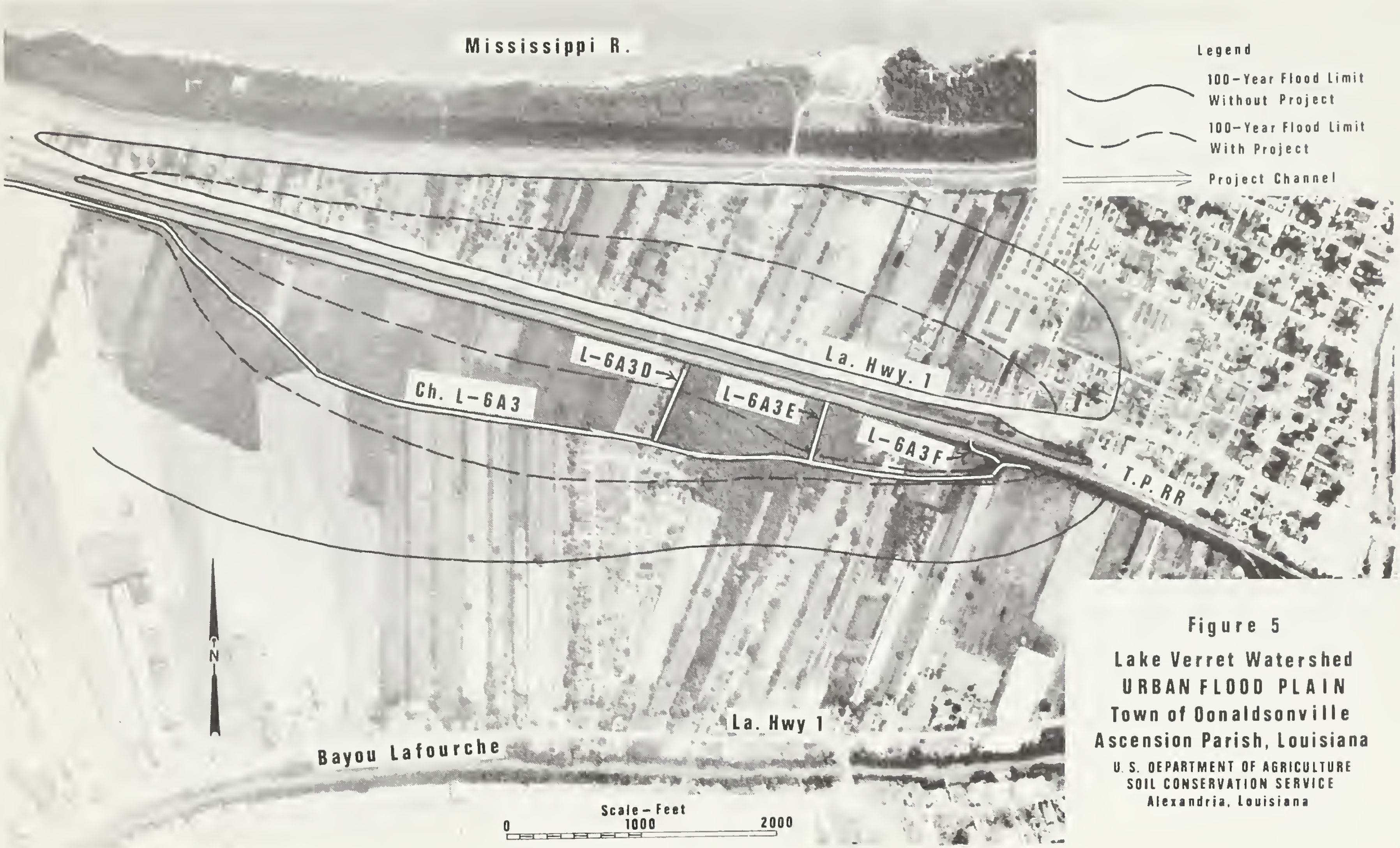


Figure 5

Lake Verret Watershed
URBAN FLOOD PLAIN
Town of Donaldsonville
Ascension Parish, Louisiana

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Alexandria, Louisiana

APPENDIX F

EXAMPLE

OPERATION AND MAINTENANCE AGREEMENT

FOR

STRUCTURAL MEASURES

____ PROJECT

THIS AGREEMENT made and entered into the _____ day of _________ 19__ is between the Soil Conservation Service, United States Department of Agriculture, hereinafter referred to as the "Service," and the following organization(s), hereinafter referred to as the Sponsor(s):

Show name(s) of Sponsoring Local Organization(s) responsible for operation and maintenance

The measures covered by this Operation and Maintenance Agreement are identified as:

Individually name and identify the works of improvement listed in the Work Plan.

As an example:

All multiple-purpose channels listed in the Watershed Work Plan.

A. OPERATIONS

1. The Sponsor will be responsible for and will operate or have operated without cost to the Service the structural measures in compliance with any applicable Federal, State, and local laws, and in a manner that will assure that the structural measures will serve the purpose for which installed as set forth in the Work Plan.

2. The Service will, upon request of the Sponsor and to the extent that its resources permit, provide consultative assistance in the operation of the structural measures.

B. MAINTENANCE

1. The Sponsor will:

   a. Be responsible for and promptly perform or have performed without cost to the Service except as provided in Paragraph C, Establishment Period, all maintenance of the structural measures determined by either the Sponsor or the Service to be needed.

   b. Obtain prior Service approval of all plans, designs, and specifications for maintenance work involving major repair.

2. The Service will, upon request of the Sponsor and to the extent that its resources will permit, provide consultative assistance in the preparation of plans, designs, and specifications for needed repair of the structural measures.

C. ESTABLISHMENT PERIOD

1. During the Establishment Period, as herein defined, the Service will bear such part of the cost of any needed major repairs to the structural measures, including associated vegetative work, as is proportionate to the original construction costs borne by the Service in the construction of the structural measures except that the Service will not bear any of the cost for:

   a. Repairs to channels or portions thereof which do not have permanent linings such as concrete, riprap, or grouted rock.

   b. Repairs determined by the Service to have been occasioned by improper operation or maintenance, or both.

   c. Repairs that are mutually determined by the Sponsor and the Service as being items of normal maintenance rather than major repair and are not therefore in keeping with the spirit and intent of the Establishment Period provisions.

2. The Establishment Period for structural measures (exclusive of any associated vegetative work) is a period of 3 years ending at midnight on the third anniversary of the date on which the structural measure is accepted.

3. The Establishment Period for vegetative work associated with a structural measure is a period from date of acceptance

of the initial vegetative work to midnight of the date on which the Service writes the Sponsor advising that an adequate vegetative cover has been obtained. However, this period shall not exceed two growing seasons or the end of the Establishment Period for the associated structural measure whichever is greater in time.

4. As used in the two preceding paragraphs, and elsewhere in this Agreement, the following words have the meanings described below:

   ACCEPTED, ACCEPTANCE: The date structural or vegetative measures are accepted from the contractor when a contract is involved, or the date structural or vegetative measures are completed to the satisfaction of the Service when force account operations are involved.

   ADEQUATE VEGETATIVE COVER: A minimum of seventy percent (70%) evenly distributed cover of the desirable species, with no active rilling that cannot be controlled by the vegetation.

5. Major repair may involve such things as (1) replacing significant backfill around structures resulting from major erosion damages, (2) revegetating where adequate cover was not obtained, (3) restoring areas with significant erosion, and (4) removing trash and debris from bridges, culverts, and fence crossings.

6. No action with respect to needed repairs during the Establishment Period will be taken by the Sponsor or the Service which would lessen or adversely affect any legal liability of any contractor or his surety for payment of the cost of the repairs.

D. <u>INSPECTIONS AND REPORTS</u>

1. During the Establishment Period the Sponsor and the Service will jointly inspect the structural measures at least annually and after unusually severe floods or the occurrency of any other unusual condition that might adversely affect the structural measures. It is desirable the annual inspections be performed during the month shown below. Any supplemental inspections then determined necessary will be scheduled and agreed to at that time.

   ____
   (Month)

2. After the Establishment Period, the structural measures will be inspected annually by the Sponsor, preferably during the month shown below, and after unusually severe floods or the occurrence of any other unusual condition that might adversely affect the structural measures.

____
(Month)

3. After the Establishment Period, the Service may inspect the structural measures at any reasonable time.

4. A written report will be made of each inspection. The report of joint inspections will be prepared by the Sponsor with the assistance of the Service. A copy of each report will be provided by the party preparing the report to the other party within 10 days of the date on which the inspection was made.

E. RECORDS

The Sponsor will maintain in a centralized location a record of all inspections performed both individually and jointly by the Sponsor and the Service, and of all significant actions taken by the Sponsor with respect to operation and maintenance. The Service may inspect these records at any reasonable time.

F. GENERAL

1. The Sponsor will:
   a. Prohibit the installation of any structures or facilities that will interfere with the operation or maintenance of the structural measures.

   b. Obtain prior Service approval of the plans and specifications for any alteration or improvement to the structural measures.

   c. Obtain prior Service approval of any agreement to be entered into with other parties for the operation or maintenance of all or any part of the structural measures, and provide the Service with a copy of the agreement after it has been signed by the Sponsor and the other party.

2. Service personnel will be provided the right of free access to the structural measures at any reasonable time for the purpose of carrying out the terms of this agreement.

3. The responsibilities of the Sponsor under this agreement are effective simultaneously with the acceptance of the works of improvement in whole or in part.

G. SPECIAL PROVISIONS

An Operation and Maintenance (O&M) Plan will be prepared for each structure or channel (or similar groups of structures of channels) listed on page one of this agreement at the time of advertisement for bids for such structures of channels. Such O&M Plans will be made a part of this agreement.

H. AUTHORIZATION

Name of Sponsor ______________________________

By ______________________ Title ______________

This action was authorized at an official meeting of the Sponsor

named immediately above on ____________ at ____________

Attest ______________________ Title ______________

Name of Sponsor ______________________________

By ______________________ Title ______________

This action was authorized at an official meeting of the Sponsor

named immediately above on ____________ at ____________

Attest ______________________ Title ______________

Soil Conservation Service, United States Department of Agriculture

By ______________________ Title ______________

OPERATION AND MAINTENANCE PLAN
(CHANNELS)

These channels have been designed and constructed to provide flood protection and drainage for the surrounding lands. This will be accomplished if the channel dimensions are not reduced and the flow of water is not obstructed by trees, brush, weeds, cross fences, and heavy trash. For example, a moderately heavy growth of 2-year old willows in the channel could cut the planned capacity by 50 percent or more. The same is true for equivalent growths of cotton woods, alders, and water-loving plants, such as cattails.

Another important feature of the channel job is the service road along the banks. It is essential that this road be passable with maintenance equipment at all times.

Many of the things required to keep the channel in good working condition could be called routine maintenance, which is really nothing more than "normal good care." This includes:

1. Control of brush and weeds. Removal of willows, cottonwoods, alders, the larger woody-stemmed weeds and water plants is a yearly job. They may need attention twice a year in those years when conditions are unusually favorable for rapid regrowth. The job of control more than doubles with the age of the plants. As an example, the difficulty and cost of killing 2-year old willows can be about four times as difficult and costly as killing them in the early seedling stage. In addition, the 2-year old and older willows tend to block the channel even after they are killed.

   Spraying, chopping, or mowing are all effective ways of getting rid of brush and weeds. Remember, the service road and the berms need attention the same as the channel.

   The kinds of brush that are likely to give the most trouble are blackwillow, buttonbush, cottonwood, and sycamore.

   The best time to spray is about the time the brush becomes full-leaved.

   CAUTION: If herbicides are handled or applied improperly or if unused portions are not disposed of safely, they may be injurious to humans, domestic animals, desirable plants, fish, or wildlife, and they may contaminate water supplies. Drift from aerial spraying can contaminate nearby crops and other vegetation. <u>Follow the directions and heed all precautions on the container label</u>.

2. Keep fences and water gaps in good condition. Look them over after each bank-full flow. Replace missing staples and posts; replace broken wire.

3. Maintain side inlet structures and bridges. Replace any soil that washes from around the metal pipes under the service road.

4. Remove sediment deposits as soon as possible after they are formed. If allowed to remain, they not only reduce the size of the channel, they provide good sites for willows and other brush to get a foothold. They may also divert the flow and cause erosion of the channel banks.

APPENDIX G

Letters of Comments Received on the Draft Environmental Impact Statement

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
FIRST INTERNATIONAL BUILDING
1201 ELM STREET
DALLAS, TEXAS 75270

October 28, 1977

Mr. Alton Mangum
State Conservationist
U.S. Department of Agriculture
Soil Conservation Service
P.O. Box 1630
Alexandria, Louisiana 71301

Dear Mr. Mangum:

We have reviewed the Draft Revised Environmental Impact Statement (EIS) and Supplemental Watershed Work Plan Agreement for the Lake Verret Watershed located within Ascension, Assumption, and Iberville Parishes, Louisiana. This project will include 168 miles of channel work with appurtenant measures, structures for water control and measures to minimize adverse effects to fish and wildlife.

This statement provides an adequate discussion of the possible impacts that could result in association with implementation of this project.

We classify your Draft Environmental Impact Statement as LO-1. Specifically, we have no objections to the project as it relates to Environmental Protection Agency's (EPA) legislative mandates. The statement contained sufficient information to evaluate adequately the possible environmental impacts which could result from project implementation. Our classification will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal actions, under Section 309 of the Clean Air Act.

Definitions of the categories are provided on the enclosure. Our procedure is to categorize the EIS on both the environmental consequences of the proposed action and on the adequacy of the impact statement at the draft stage, whenever possible.

We appreciate the opportunity to review the Draft Environmental Impact Statement. Please send us two copies of the Final Environmental Impact Statement at the same time it is sent to the Council on Environmental Quality.

Sincerely yours,

Acting for
Adlene Harrison
Regional Administrator

Enclosure

ENVIRONMENTAL IMPACT OF THE ACTION

LO - Lack of Objections

EPA has no objections to the proposed action as described in the draft impact statement; or suggests only minor changes in the proposed action.

ER - Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating Federal agency to re-assess these aspects.

EU - Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

ADEQUACY OF THE IMPACT STATEMENT

Category 1 - Adequate

The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

Category 2 - Insufficient Information

EPA believes the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

Category 3 - Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement. If a draft statement is assigned a Category 3, no rating will be made of the project or action, since a basis does not generally exist on which to make such a determination.

UNITED STATES DEPARTMENT OF COMMERCE
The Assistant Secretary for Science and Technology
Washington, D.C. 20230
(202) 377 -4335

November 3, 1977

Mr. Alton Mangum
State Conservationist
U.S. Department of Agriculture
Soil Conservation Service
Post Office Box 1630
Alexandria, Louisiana 71301

Dear Mr. Mangum:

This is in reference to your draft revised environmental impact statement entitled, "Lake Verret Watershed-Ascension, Assumption, and Iberville Parishes, Louisiana." The enclosed comments from the National Oceanic and Atmospheric Administration are forwarded for your consideration. These comments have just been received in this office although the commenting period ended on October 31, 1977. However, Mr. T. D. Prestridge informed Ms. M. L. Williams of my staff on November 2, 1977 that the comments would be reproduced and accommodated if they were sent to your office promptly.

Thank you for giving us an opportunity to provide these comments, which we hope will be of assistance to you. We would appreciate receiving four (4) copies of the final statement.

Sincerely,

George S. Gordon
for Sidney R. Galler
Deputy Assistant Secretary
for Environmental Affairs

Enclosure Memo from: Mr. William H. Stevenson
Regional Director
National Marine Fisheries Service (NOAA)

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P. O. BOX 60267
NEW ORLEANS, LOUISIANA 70160

IN REPLY REFER TO
LMNPD-RE

3 November 1977

Mr. Alton Mangum
State Conservationist
US Department of Agriculture
Soil Conservation Service
P.O. Box 1630
Alexandria, Louisiana 71301

Dear Mr. Mangum:

Reference is made to your letter dated 31 August 1977 requesting our review and comments on the draft supplemental watershed work plan agreement and the draft revised environmental impact statement (EIS) for the Lake Verret Watershed, Louisiana. Your letter and both documents were forwarded from our Office of the Chief of Engineers, Washington, to this office for review and direct reply.

We have reviewed these documents in accordance with our areas of responsibility and expertise as outlined in the Council on Environmental Quality guidelines, Title 40, CFR, Part 1500, published in the "Federal Register" dated 1 August 1973, and US Army Corps of Engineers administrative procedures for permit activities in navigable waters or ocean waters, Title 33, CFR, Parts 320-329, published in the "Federal Register" dated 19 July 1977.

The following comments on the draft revised EIS are offered for your consideration:

a. Detailed comments:

(1) Pages 2 and 19. There is a discrepancy between project channel mileage (168 miles) stated in the first paragraph on page 2 and project channel mileage (215 miles) stated in the first complete paragraph on page 19. This should be clarified.

(2) Pages 25 and 109. The references to wetland development on these pages are inadequate relative to providing mitigation to compensate for project effects. The discussions should respond to the following questions:

(a) Would the constructed wetland be adjacent to, part of, or isolated from the existing wetland system?

(b) Would this land be as productive and of equal value and quantity as those wetlands destroyed by project implementation?

(c) Would the newly constructed wetland be available for public use or for private use only?

(3) Page 30. The last paragraph on this page should describe the existing vector problems. It should include a list of potential vectors in the description of the environmental setting and in Appendix D. Also, structural and/or nonstructural plans for prevention or control of vector problems should be discussed here.

(4) Page 53, Economic Resources. We recommend the use of OBERS Series E projections by the US Department of Commerce be provided in this section. If these are inappropriate, an explanation should be given as to their differences.

(5) Page 58, Plant and Animal Resources. A category for algae components that occur in the project area should be included under this section and in Appendix D. Perhaps algae could be also included in the discussions on littoral regions on page 64. Apparently, much emphasis is placed on monitoring the water quality of the area, but none is placed on the primary producers and consumers in the aquatic environment, which would be greatly impacted by the proposed project. Certain algae species are excellent indicators of the area's water quality; and as primary members of the local food webs, they should be considered thoroughly.

(6) Page 59. Herbaceous ground cover species exist in hardwood bottomlands and should be included in the discussion here; more species should be added to those already listed in Appendix D. Many more herbaceous species exist in the project area than are listed in the text, and these contribute to the support of diverse wildlife populations of the proposed project area. Add swamp privet and green ash to the species located in the seasonally flooded hardwood bottomlands. We recommend that a discussion on the invertebrate species that exist in the area be included in the text and that these species be listed in Appendix D.

(7) Page 68. Add "or Threatened" after "Endangered" in the title and include a discussion of the threatened American alligator, which occurs in the proposed project area.

(8) Page 74. Mention should be made here of the New Orleans-Baton Rouge Metropolitan Area study by the Corps of Engineers, although no interaction is apparent at this time.

(9) Page 76, last paragraph. The wetlands (100, 500 acres) of the overall forested area serve as excellent wildlife habitat and contribute significantly to the adjacent streams and lakes. Alteration of the water regimes of these wetlands would detract from the region's productivity. This would be an example of the cumulative impacts which could result from implementation of a water management project.

(10) Page 96, first complete paragraph. Prolonged and frequent flooding would destroy large acreages of diverse wildlife habitat. Numerous plant species which are less water tolerant would be lost. This would result in formation of large ponded areas which would or would not experience revegetation by species of greater flood tolerances. Until they revegetate, these flooded areas would contribute little to the overall area's productivity.

(11) Page 112, first incomplete paragraph. Reduction in overbank flooding would directly impact plant species composition of these hardwood bottomlands. Significant adverse impacts would occur to those species that require saturated or seasonally saturated soils for growth and reproduction. Loss of this productive habitat would severely impact dependent animal species associated with this habitat.

b. General comments:

(1) The EIS does not provide any water quality, sediment, and elutriate data to satisfy the requirements of the Environmental Protection Agency regulations concerning discharge of dredged or fill material into navigable waters of the United States ("Federal Register," 5 September 1975). These data are necessary to evaluate the proposed project from the water quality aspect and should be included in the EIS.

(2) A large portion of the proposed project area is influenced by backwater effects of Lower Atchafalaya River flows, and as the river's flowline continues to rise, so will the area's sump levels. The impacts of this trend upon the proposed project apparently have

not been addressed in either document. Measures to reduce backwater flooding are being addressed in an ongoing comprehensive study by the Corps of Engineers of the Atchafalaya Basin Floodway project.

(3) We suggest that the following paragraph be added to page 93: "The Corps of Engineers, Department of the Army, has the responsibility for regulating disposal of dredged or fill material in waters of the United States, including wetland areas, as defined in the permit regulations of the Corps of Engineers (33 CFR 320 through 329). Permits must be obtained for such disposal, pursuant to the rules and regulations of the regulatory program, as published on 19 July 1977 in the "Federal Register" 42(138), pages 37,122 through 37,164."

Considerations used in establishing the hydrologic parameters of the watershed work plan are considered sound.

We would appreciate if, in the future, you would send this office five copies of each EIS requiring our review and response. This is the minimum number of copies required for us to expedite the review.

Thank you for the opportunity to review and comment on these documents.

Sincerely yours,

fo LTC, CE
EARLY J. RUSH III
Colonel, CE
District Engineer

Copy furnished:

Mr. Charles Warren
Council on Environmental Quality
Washington, DC 20506

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Duval Building
9450 Gandy Boulevard
St. Petersburg, FL 33702

OCT 2 1977

October 19, 1977 FSE61/GB

TO: Director, Ofc of Ecology & Environmental Conservation, EE

OCT 25 1977

THRU: Assistant Director Scientific & Technical Services, F5

FROM: William H. Stevenson Regional Director

SUBJECT: Comments on Draft Revised Environmental Impact Statement Lake Verret Watershed, Ascension, Assumption, Iberville Parishes, Louisiana (SCS)

The subject DEIS was sent directly to the National Marine Fisheries Service on August 31, 1977, by Mr. Alton Mangum, State Conservationist (SCS), Alexandria, Louisiana, for review and comment.

The statement has been reviewed and the following comments are submitted for your consideration.

General Comments:

The FEIS should discuss the potential project impacts on the freshwater and estuarine fishery resources downstream from Lake Verret.

Specific Comments:

Environmental Impacts

Adverse Environmental Effects

Page 125 (also Summary Sheet on page 5). The DEIS states that, "Some increases in ammonia nitrogen, nitrate nitrogen, and orthophosphate will occur in the Lake Verret system with associated impacts on fish and wildlife populations" and that "Land use changes, more intensified agriculture, reduction of out-of-bank flooding and more rapid removal of surface run-off will result in increases in the amount of agricultural chemicals entering some waterways with subsequent impacts on fish and wildlife populations."

The FEIS should specify the life stages and species of fish and shellfish that would be impacted, and what impacts would be anticipated. Since chemical fertilizer components are mentioned in the first quoted sentence, it appears that the agricultural chemicals mentioned in the second sentence would primarily be pesticides. Therefore, the kinds and amounts of each pesticide anticipated for use in the watershed if the project were completed should be presented along with a thorough review of the impacts of each on life stages of the most common species of fish and shellfish in the area.

Structural Measures

Water Quality

Page 113. It is stated that, "Nutrient concentrations were generally proportional to the percent of land in agriculture" and on page 115 that, "The increases in pesticides are not expected to reach Lake Verret or other downstream areas because of the cleansing action of the extensive wetlands upstream of Lake Verret. In addition, the increased use of needed conservation practices will help offset increased pesticide concentrations in downstream aquatic environs." It should be explained whether pesticide concentrations would be proportional to the percentage of land in agriculture as with nutrient concentrations. The cleansing action of wetlands with regard to pesticides should be discussed and documented for each toxic compound expected to be used. The "needed conservation practices" should also be described, including a discussion on the extent and manner in which they would reduce the various pesticide concentrations downstream.

The probability and resulting impacts of bio-accumulation of any of the toxic pesticides in organisms using or entering estuarine nursery areas downstream from Lake Verret, and any other waters into which this project would drain, should be thoroughly discussed. This presentation should include separate discussions for each pesticide that would be involved and how each would be expected to impact the most common species of fish and shellfish in the recreational and commercial fisheries along this part of the Louisiana coast.

Appendix H. Water Quality Data. The tables reporting pesticide levels should be revised to include estimates of the levels that would be anticipated upon completion of the project.

Enclosure
SCS Ltr Dtd 8-31-77

cc:
F53 (3)
FSE612

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

OCT 31 1977

PEP ER-77/842

Mr. Alton Mangum
State Conservationist
Soil Conservation Service
Department of Agriculture
Post Office Box 1630
Alexandria, Louisiana 71301

Dear Mr. Mangum:

Thank you for the letter of August 31, 1977, requesting our views and comments on a draft watershed work plan and revised draft environmental statement for the Lake Verret Watershed, Ascension, Assumption and Iberville Parishes, Louisiana. We find that these documents adequately consider most areas that fall within our jurisdiction and/or special expertise. However, for clarification purposes we do wish to make the following comments.

We are pleased to note that most of the comments made by us on the preliminary draft statement have been incorporated into the revised draft statement. We do have a concern with the mitigation discussion described on page 25 of the draft statement. In the final statement we suggest using the term "loss prevention" to cover all activities that attempt to avoid or compensate for project induced fish and wildlife losses.

The area to be developed into a Type 1 wetland is described as a productive bottom-land hardwood area. This area is presently deemed to be valuable from a wildlife standpoint. Any plan to establish this area as a crawfish/waterfowl pond will enhance these species of fish and wildlife, but only at the expense of the terrestrial wildlife species such as white-tailed deer and wild turkey. We suggest developing the crawfish/waterfowl area on private land. Since this development will not be available to the general public, the land acquisition and development is one of enhancement instead of mitigation. To compensate for the loss of 27 acres of Type 7 wetlands, we

suggest acquisition of an area with minimal wildlife values such as an abandoned or marginal farm land for wetland development. Such a development must be opened to the public.

We assume the compensation features will be subject to a Corps of Engineers' permit. To avoid any future conflict, we suggest additional coordination with our Fish and Wildlife Service on the development of the compensation plan.

On page 112 of the draft environmental statement we suggest that the magnitude of the reduction in fish populations due to channel enlargement should be estimated on a percentage basis.

We hope these comments will be of assistance to you.

Sincerely,

Larry E. Meierotto
Deputy Assistant SECRETARY

UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20250

OFFICE OF EQUAL OPPORTUNITY

SEP 14 1977

IN REPLY REFER TO: 8140 Supplement 8

SUBJECT: Draft Revised Environmental Impact Statement, Lake Verret Watershed, Louisiana

TO: Alton Mangum
State Conservationist

THRU: Verne M. Bathrust
Deputy Administrator for Management, SCS

We have reviewed the draft revised statement with special interest in your assessment of the impacts of proposed actions upon minority group persons living in or near the project area or otherwise affected by the proposed actions.

We are pleased to note, at pages 3, 54ff and 121ff, that you have included minority socioeconomic information and estimate the effects of the proposed action to fall equally upon minorities and nonminorities alike. Also, at p.vi of the Watershed Plan Agreement, you have included a nondiscrimination agreement to be signed by all parties.

Thank you for your time and effort to assure equitable treatment for all persons affected by these actions.

James Frazier

JAMES FRAZIER
Director

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
CENTER FOR DISEASE CONTROL
ATLANTA, GEORGIA 30333
TELEPHONE (404) 633 3311

November 25, 1977

Mr. Alvin Mangum
State Conservationist
USDA Soil Conservation Service
P.O. Box 1630
Alexandria, LA 71301

Dear Mr. Mangum:

We have reviewed the draft revised environmental impact statement and draft supplemental watershed work plan agreement for the Lake Verrett Watershed, Louisiana. The proposed work should not create additional mosquito breeding sites in the area and therefore, an adverse vector-borne disease impact should not result from this project.

Sincerely yours,

for Samuel G. Breeland
Water Resources Activity
Chief, Medical Entomology Branch
Vector Biology & Control Division
Bureau of Tropical Diseases

cc: Mr. G. Roy Hayes
HEW Region VI

State of Louisiana
Department of Transportation and Development

Edwin Edwards
Governor

George A. Fischer
Secretary

Soil and Water Conservation Committee

Post Office Drawer CS · Louisiana State University Baton Rouge, Louisiana 70893

November 18, 1977

Mr. Alton Mangum, State Conservationist
Louisiana State Office
3737 Government Street
P.O. Box 1630
Alexandria, Louisiana 71301

Dear Mr. Mangum:

Your letter of August 31, 1977, transmitting the supplemental work plan and draft of environmental impact statement for the Lake Verret Watershed, Louisiana has been received.

The Louisiana State Soil and Water Conservation Committee has reviewed and approved the supplemental work plan and environmental impact statement and has no further suggestions to make.

If additional information is needed, please let us know.

Sincerely,

Charley S. Staples

Charley S. Staples
Executive Director

CSS:ls

cc: Fred Huenefeld, Jr.
Lower Delta SWCD
Ascension Parish Police Jury
Assumption Parish Police Jury
Iberville Parish Police Jury

State of Louisiana

STATE OF LOUISIANA · UNION JUSTICE & CONFIDENCE

WILD LIFE AND FISHERIES COMMISSION
400 ROYAL STREET
NEW ORLEANS 70130

J. BURTON ANGELLE
DIRECTOR

EDWIN EDWARDS
GOVERNOR

2 November 1977

Mr. Alton Mangum
State Conservationist
United States Department of Agriculture
Soil Conservation Service
Post Office Box 1630
Alexandria, LA 71301

RE: Lake Verret Watershed
Draft Revised Environmental Impact Statement

Dear Mr. Mangum:

Personnel of the Louisiana Department of Wildlife and Fisheries have reviewed the above referenced project and offer the comments attached to this letter.

As you know our staff has assisted your personnel in an attempt to develop a plan that will minimize damages to the fish and wildlife populations in the project area. We are pleased to see that some of our suggestions have been used in the preparation of this document.

We very much appreciate the opportunity to participate in the planning process for this project.

Sincerely,

J. Burton Angelle

J. Burton Angelle
Secretary

JBA:DD:ms

Attachment

COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

LAKE VERRET WATERSHED

Page 5, Adverse Impacts, 7th and 8th paragraphs. Should read: "Some increases in ammonia nitrogen, nitrate nitrogen, and orthophosphates will occur in the Lake Verret system with adverse effects on fish and wildlife populations."

"Land use changes, more intensified agriculture, reduction of out-of-bank flooding, and more rapid removal of surface runoff will result in increases in the amount of agricultural chemicals entering the waterways associated with this system and will have adverse effects on fish and wildlife populations found in the project area"

Page 18, 1st paragraph. The last sentence is inadequate by not giving the actual number of individual land users who have voluntarily applied and installed land treatment measures in other PL-566 projects in Louisiana. The last sentence should cite the actual information available from records on land treatment measures installed.

Page 94, 1st paragraph. First sentence "will result" should be changed to "may result".

Page 95, 3rd paragraph. The 1200 acres is not identified by location and is only a determination based on various indirect factors without the involvement of the land owners. We feel this amount is too low and should be increased.

Page 115, last paragraph. Pesticide levels will also be increased by the dredging activity which will agitate and release these pesticides from the sediments. Pesticides can be expected to reach the Lake Verret and other downstream areas.

Spoil from M-2 should be placed on the north side of the canal to aid in retaining wastewater from sugar mills in its semi-holding pond. This measure would include blocking off any draining canals, sloughs or other such waterways entering these canals from the north.

Spoil from M-4 should be placed on the south side of the canal.

Dredging on M-3, L-3A, L-3B and L-6A should be eliminated due to high wildlife and fish resource losses expected to occur as a result of this construction.

The use of explosives for excavation of channels through wooded areas have been shown to have a lesser impact on the fish and wildlife resources than conventional dredging methods.

Public Recreational Use of the proposed mitigation area will be extremely limited. Although the management plan and construction of the mitigation area will be accomplished with public funds on private land, there are no provisions for public use of this area. While adequate mitigation is both a desirable and commendable project feature, we feel that this type of mitigation area does not fulfill the intended purposes of the mitigation process.

State of Louisiana

EXECUTIVE DEPARTMENT

Governor's [illegible] LETTERHEAD on Environmental Quality

Office of Science, Technology
and Environmental Policy
Post Office Box 44066
Baton Rouge, Louisiana 70804

EDWIN EDWARDS
GOVERNOR

XXXXXXXXXXXXXXX
Lee Jennings
Director

P. O. BOX 44066
CAPITOL STATION
BATON ROUGE 70804
504/389.6901

September 6, 1977

Mr. Alton Mangum
State Conservationist
U.S. Department of Agriculture
Post Office Box 1630
Alexandria, LA 71301

RE: Revised Environmental Impact Statement - Lake Verret Watershed

Dear Mr. Mangum:

The above-referenced matter concerning environmental quality has been received and reviewed by the staff of the Governor's Council on Environmental Quality. From the information contained in the package sent to our office, the Council issues a no objection on this particular project. The rules and regulations governing this project should continue to be in full compliance with all State and Federal regulatory agencies.

The Council appreciates this opportunity to participate in the review process.

Sincerely,

Wm J. Mollere

William J. Mollere
Manager, Administration and Operations

WJM/cdh

cc: Ms. Deborah Newchurch - Environmental Coordinator
Commission on Intergovernmental Relations

GILBERT L. DOZIER, COMMISSIONER

Louisiana Department of Agriculture

P. O. BOX 44302, CAPITOL STATION

Baton Rouge, Louisiana

70804

September 12, 1977

Mr. Alton Mangum
State Conservationist
United States Department of Agriculture
Soil Conservation Service
P.O. Box 1630
Alexandria, Louisiana 71301

Dear Alton:

I have reviewed with more than common interest your excellent Environmental Impact Statement regarding Lake Verret Watershed.

As Commissioner of Agriculture for the State of Louisiana, I fully concur in your efforts for a planned project to improve not only the agricultural cropland, pasture and woodland, but also the recreational opportunities for that area.

Since Lake Verret is one of the favorite fishing areas for Baton Rouge sportsmen, I am sure many of us are going to stay constantly abreast of the progress envisioned by this project.

Sincerely,

Gilbert L. Dozier

GILBERT L. DOZIER
Commissioner

GLD:RG:bd

Wildlife Management Institute

709 Wire Building, 1000 Vermont Ave., N.W., Washington, D.C. 20005 • 202 / 347-1774

DANIEL A. POOLE
President
L. R. JAHN
Vice-President
L. L. WILLIAMSON
Secretary
IRA N. GABRIELSON
Board Chairman

Southcentral Representative
Murray T. Walton
815 Christopher Street
Austin, Texas 78704
Telephone: 512—444-3901

October 21, 1977

Mr. Alton Mangum
State Conservationist
U.S. Soil Conservation Service
P.O. Box 1630
Alexandria, Louisiana 71301

Dear Mr. Mangum:

The revised Draft Environmental Impact Statement for the Lake Verret Watershed, Ascension, Assumption, and Iberville Parishes, Louisiana has been reviewed. This document indicates that significant changes have been made in the Watershed plan to lessen environmental damages, however, some additional changes in the proposed project appear to be in order.

Project induced clearing of 1,200 acres of bottomland hardwood forest (pages 4, 95, 118) is an unacceptable effect of a PL-566 Watershed Project. This loss of forest is in addition to the loss of 698 acres of wooded wildlife habitat (page 105) for channel excavation. If the proposed drainage system cannot be constructed in such a manner that will not provide drainage of woodlands conducive to clearing, then perpetual easements or some other similar arrangement should be found to insure that publically financed drainage is not contributing to the destruction of bottomland hardwood forest. The development of a 30 acre wetland (page 109) to replace the loss of 29 acres of woodduck habitat lost for channel excavation seems inadequate mitigation for total loss of wooded wetland habitat. Additional mitigation appears to be in order. Also, are any provisions being made for public access and hunting on this wetland area to be developed as a project expense?

Despite SCS regulations to the contrary, past watershed projects in Louisiana have resulted in conversion of large acreages of bottomland hardwood forest to rowcrop agriculture. Assurances were made that this practice would be discontinued (see paragraph 1, page 24), but apparently the SCS in Louisiana plans to continue bringing land into cultivation. Page 107 indicates loss of seasonal flooding on 1,555 acres and alteration of flooding on an additional 14,330 acres of Type I wetlands.

Serious question arises therefore as to the confidence that can be placed in the assurances in the Draft EIS that 20,700 acres of

forest land for upland and wetland wildlife habitat will be retained (page 17, footnote 3). What type of arrangement has been made to secure the retention of these woodlands?

The statement on page 84 to the effect that erosion is not a major problem due to (1) deep soils, (2) retention of eroded material in the fields and (3) nearly level slope of the land is surprising since the very next sentence indicates an erosion rate of 4.17 tons per acre! This is on the threshhold of the rate of 5 tons per acre felt to be adverse to productivity even on deep soils. While the EIS talks about the reduction in erosion rate due to land treatment measures, very little reduction will occur. In fact, the estimated reduction is only 9.3 percent (using figures on page 101)! This is really not that surprising an estimate since the major "conservation"land treatment practice for on farm application is ditching. What would be surprising is actually accomplishing a 9.3 percent reduction in erosion and the predicted reduction in sedimentation.

The presentation and data on fish populations on pages 64-68 and 109-112 are most interesting and revealing. In general this information shows an increase in game fish and decrease in carp as the distance from the major agricultural areas increases. This could very likely be correlated with various aspects of water quality, particularly turbidity and pesticides.

The discussion of economic and social aspects in the Draft EIS is greatly misleading. While not questioning the need for better drainage for residential areas in Donaldsonville or the needs of certain disadvantaged groups and small farmers, serious question is raised as to the major beneficiaries of the proposed rural drainage aspects of the project. A lot of statistics are presented on farm income, etc. which cloud the fact that very little benefit will accrue other than to relatively large sugarcane and soybean farming operations.

Great pains are taken to recite figures on population, unemployment, median income, etc. (pages 53-55 and 88-92) . Information on page 56 indicates (1969 figures) a fair number of small farms which brings down the average farm size, however, many of the small farms are marginal operations with the major source of income derived from employment elsewhere, particularly at the chemical plants, etc. along the Mississippi River. Operation and income from these farms can be expected to change little due to the watershed project. In fact, the only two crops that production figures are presented for on page 56 are sugarcane and soybeans, crops that are grown on medium to large farms.

The impacts section (pages 117-123) makes considerable claims of benefits to minority groups, overall net farm income, and various other desireable social goals. The trend to larger farms as shown in the Draft EIS and outside sources of income utilized by those farming small acreages (page 91-92) appear to contradict many of these claims of widespread economic benefits due to the Lake Verret

Watershed Project.

If all the information on small farms and lower catagories of farms and lower catagories of farm income is appropriate, then why not present data on maximum farm sizes and income? What would really be revealing is a rather large scale land ownership map showing location of project ditches. Could such a map be placed in the Final EIS? Also, could agricultural land and forested land and the land which will be cleared as a result of the proposed project also be delineated on this map? Another interesting matter for inclusion in the Final EIS would be a comparison of the figures on future without project yields of sugarcane and soybeans appearing on page 56 with the present statewide average yields for Louisiana.

It is readily apparent that changes are needed in the Watershed Work Plan to prevent the clearing of 1,200 acres of forest land. Also, it is a highly questionable practice to provide benefits to 2,100 acres of land which are expected to be cleared with or without the project (page 95). The claim on page 96 that "No project channel was designed for the purpose of providing increased flood protection and drainage on forest land" is highly suspect. The level of erosion control to be provided by the project appears to be grossly inadequate. Sheet erosion will continue to exceed 4 tons per acre with the proposed project. Greater attention should be given to conservation practices other than field ditching. Steps should be taken to prevent downstream effects on fisheries due to turbidity and pesticides originating in agricultural areas. In addition, a more careful analysis of the social and economic effects of the Lake Verret Watershed seems in order. If benefits to minorities and economically disadvantaged individuals are major purpose of this project, than some <u>specific</u> plans to insure the desired effects should be included in the Final EIS and Watershed Work Plan.

Thank you for the opportunity to review this document.

Sincerely,

Murray Walton

Murray Walton

MW:fw

cc: Louisiana Department of Wildlife and Fisheries
Louisiana Wildlife Federation
U.S. Fish and Wildlife Service, Vicksburg, Miss.

Environmental
Defense
Fund

475 PARK AVENUE, SOUTH, NEW YORK, N.Y. 10016/212 686-4191

10TH ANNIVERSARY • 1967-1977

November 4, 1977

Mr. Alton Mangum
State Conservationist
U.S. Soil Conservation Service
P.O. Box 1630
Alexandria, Louisiana 71301

RE: Lake Verret Watershed

Dear Mr. Mangum:

A copy of a letter dated October 21, 1977 from the Wildlife Management Institute to you has brought to our attention that the Soil Conservation Service has released a revised draft environmental impact statement for the Lake Verret Watershed, Ascension, Assumption and Iberville Parishes, Louisiana. Unfortunately, since we do not seem to have received a copy of that draft EIS, it is difficult for us to comment. We would request that you furnish us with a copy of the revised draft EIS as soon as possible. Since the comment period may already have passed, we are furnishing our comments at this time based on the very limited information about the project available to us. We would request that you consider these comments.

Initially, we would endorse the comments of the Wildlife Management Institute as set forth in that letter of October 21, 1977.

1. The need for an Environmental Quality Plan

In addition, we assume, unless you advise us to the contrary, that this project is being planned and evaluated pursuant to the 1973 principles and standards of the U.S. Water Resource Council. Those standards require that an Environmental Quality Plan ("EQ Plan") be prepared, as well as a National Economic Development ("NED") plan. As part of an NED plan, it is appropriate for the Soil Conservation Service to consider alternative ways of designing this watershed project with structural features so as to minimize adverse environmental effects. However, an EQ plan should be concerned with environmental restoration and improvement in environmental quality, not

minimization of adverse environmental effects. From what we have been told about this project, we see little evidence that Soil Conservation Service has developed any kind of an EQ plan. Such a plan would necessarily entail reliance on non-structural measures, avoidance of destruction of bottomland hardwood forests and improvements in water quality. The EIS should describe in as much detail an EQ plan as any NED plan and alternatives.

2. <u>Arbitrary inclusions of NED benefits relating to sugar cane</u>

The primary benefits, as we understand it, of this project are to increase the amount of acreage available for and the efficiency of production of sugar cane and soybeans in addition to other commodities. In part because of overproduction of sugar cane in the State of Louisiana and elsewhere, sugar cane growers in the State of Louisiana have been seeking and have successfully obtained subsidies and price supports from the U.S. Department of Agriculture in Washington, D.C. However, the real competition to the sugar cane growers in Louisiana comes not from foreign producers of sugar cane but from corn sugar which is produced in this country.

In view of this fact, we would like an explanation from you in the EIS as to how increased sugar cane production is considered consistent with National Economic Development. It would seem to us that, in view of present agricultural policies with respect to sugar cane, reduced production of sugar cane is consistent with National Economic Development. It is absurd to say that under all circumstances increased sugar cane production increases National Economic well-being.

Furthermore, nutritionists in this country are almost unanimous in the position that Americans consume too much sugar on a per capita basis. Sugar consumption per capita has risen significantly since World War II to the detriment of public health. Nutritionists agree that a decreased consumption per capita is in the national interest and would therefore be consistent with National Economic Development, not to mention Environmental Quality. We would like to know if you agree with this assessment and, if not, what nutritionists and public health experts you have sought opinions from who would disagree with this general assessment. We would be particularly interested in any USDA scientific findings supporting any claim that increases in per capita sugar consumption would benefit public health. If in fact decreased per capita consumption of sugar is in the interest of public health in the country, we do not understand how you can claim economic benefits for increased production. Our view is that the benefits of increased sugar production are zero.

Furthermore, the country seems to be surfeited with soybeans and rice at the present time such that acreage restrictions may be imposed again and price supports are sought. Only foreign agricultural disasters may prevent this occurrence. With or without acreage restrictions, the EIS should identify the USDA national policies supporting increased farm acreage for production of soybeans and rice. In our opinion, increased acreage for production of these commodities is in conflict with national agricultural policy. What the country needs is preservation of forestland and wetlands, not more soybean land. For this reason, we consider the agricultural flood control benefits of the project to be zero.

3. Need for cumulative impact assessment and program EIS

As we understand it, your revised draft EIS looks at this watershed project in isolation from other projects in its drainage basin which have overlapping and inter-related secondary and cumulative impacts. This drainage project is designed to accelerate the drainage of floodwaters from bottomland hardwood forests and farmland. This will inevitably induce downstream flooding since the water must go somewhere. These changes in the rates and flows of downstream floodwaters should be carefully quantified and calculated. The area to the East and South of Morgan City, Louisiana, already faces severe flooding problems. It would seem to us that this project can only intensify those flood problems and increase flood stages in the areas to the South to which the flood waters would drain, whereas, the national interest, and certainly Morgan City's interest, lies in the direction of reducing potential flood hazards.

Furthermore, hydrologically and in terms of water managent, this project must be viewed together with the Bayous Chene, Boeuf and Black navigation project and Corps of Engineers flood control plans for the backwater area of Western Terrebone Parish and Morgan City east of the Lower Atchafalaya River, not to mention flood control and fish and wildlife programs throughout the Atchafalaya Basin. The Bayous Chene, Boeuf and Black navigation project to the East and South of Morgan City, through deepening and widening channels and reducing roughness coefficients, will increase water movement and accelerate drainage under different hydrologic conditions. It is imperative that you, together with other responsible agencies, consider the cumulative changes wrought by this proposed project, Bayous Chene, Boeuf and Black and proposals for flood control, such as the extension of the Avoca Island levee, on the entire flow regime of the Lake Verret Basin.

4. The need to preserve bottomland hardwood forests

Similarly, this and numerous other proposed Soil Conservation Service projects in Louisiana and elsewhere in the southeast may result in the devastation of tens of thousands and perhaps hundreds of thousands, of acres of bottomland hardwood forests. Originally, this part of the country had some 20 million acres of bottomland hardwood forests. That number is now down to 5 million acres. This country can no longer afford to lose any more of this important renewable resource. The losses of bottomland hardwood forests which are discussed in your EIS can only be intelligently evaluated and assessed in the context of other projected bottomland hardwood losses from other public investments by the USDA and the Corps of Engineers and private drainage schemes.

5. Water quality impacts

Finally, it is imperative that the EIS disclose in detail the water quality impacts of this project. It is well-known that agricultural non-point source pollution constitutes a very serious and growing water pollution problem in the Lower Mississippi River Basin, the Atchafalaya Basin and all of coastal Louisiana. The most serious agricultural contaminants involved, in addition to excess sediments, are nutrients and toxic agricultural pollutants. It is not sufficient for the Soil Conservation Service to say that the EPA has responsibility,under various statutes, to control discharges of toxic pollutants or to prohibit the use of proven toxic or carcinogenic agricultural pesticides. The long-standing opposition of the USDA to efforts by EPA to control the use of toxic agricultural pesticides should be evidence enough that legislation on the books is not a guarantee that pollution, with concommitant public health problems, will not occur. Indeed, such a position is the very height of irresponsibility.

In this EIS, the Soil Conservation Service should review existing data on agricultural pollutants, including toxic pollutants, and other river basins which have experienced this kind of drainage project. If you are having difficulty finding such data, please let us know. We would anticipate that increased loads of agricultural pollutants, with this project in place, would move more rapidly southward throughout the Verret and Western Terrebone Parish water basins. This may very well imperil the quality of public water supplies. The cost of installing activated charcoal filters in public water supplies in order to abate pollution by agricultural pesticides should be carefully considered and quantified and included as a cost of the project.

6. <u>The mitigation plan</u>

As we understand it from the Wildlife Management Institute letter, any "mitigation plan" which you have considered is clearly inadequate. Furthermore, we want you to understand that there is no way in which to mitigate this and similar Soil Conservation Service projects which are destroying the country's renewable resource base and its bottomland hardwood forests. Taken to its logical extreme, even a one for one mitigation plan would mean that the country would be left with only 2-1/2 of its remaining 5 million acres of bottomland hardwood forests. This is inexcusable.

Furthermore, we would hope that the U.S. Department of Interior would accelerate a program for acquisition of bottomland hardwood forests as perhaps the only technique to preserve them in the face of efforts by the Soil Conservation Service and other agencies to destroy them. This clear conflict in policy between federal acquisition programs designed to protect remaining bottomland hardwood forests and Soil Conservation Service efforts to drain and destroy them should be clearly articulated, explained and, if possible, resolved in the EIS.

Yours very truly,

James T.B. Tripp
Counsel

mh

DUFOUR, LEVY, MARX, LUCAS & OSBORNE
ATTORNEYS AT LAW
1006 FIRST NATIONAL BANK OF COMMERCE BUILDING
NEW ORLEANS, LA. 70112

WILLIAM C. DUFOUR (1871-1956)
LEONARD B. LEVY
EDWIN F. MARX
WILLIAM M. LUCAS, JR.
MICHAEL OSBORNE

DWIGHT W. NORTON
PATRICK RANKIN

AREA CODE 504
529-5551

October 27, 1977

State Conservationist
U. S. Department of Agriculture
Soil Conservation Service
Post Office Box 1630
Alexandria, Louisiana 71301

RE: COMMENTS ON REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT --Lake Verret Watershed.

Gentlemen:

I submit to you, in my capacity as special counsel to the City of Morgan City and St. Mary Parish, the following comments on your Lake Verret Watershed Revised Draft Environmental Impact Statement.

Significantly more attention needs to be given to the downstream impacts of the project, including the impacts on the receiving waters below the Watershed Project boundary. For example, you should attempt to quantify the increases in Ammonia Nitrogen, Nitrate Nitrogen, and Orthophosphates which will occurr in Lake Verret & the Lake Verret System. The Lake Verret System should be defined. The adverse effects should be fully described and quantified where possible. The amounts of agricultural chemicals which enter the waterways with and without the project should be quantified and the impacts assessed both within and without the project boundaries. More complete discussion of the problem of pesticide runoff is needed both in regard to its direct effects on water quality and the cumulative effect of pesticides in combination with the other pollutants that will be introduced into the downstream waters.

At various places in the statement you refer to land treatment measures both in the context of land treatment measures being previously applied and projected land treatment measures. The land treatment measures are not adequately described in either the context of past or future applications. Your presumption as to future land treatment measures appears to have no basis or justification on a historical basis. You should set forth in a defnitive manner the justification for

making the projections as to future land treatment measures with the project.

With regard to your section dealing with economics, the statement displays a distinct prejudice towards finding benefits. A more objective approach is required in the final document. Some of the dollar figures that you give appear to be readily susceptible to calculation where others such as the figure of $45,000.00 for improved quality of farm products at page 96 and the claim of $129,400.00 for more intensive use of cropland at page 96 and 97 seem to be more speculative. You should distinguish between firm figures and speculative figures and give the basis for your calculation. Agaion, a measure of objectivity and candor is required but is not reflected in the draft document.

All projections as to future actions should have their bases clearly stated. For example your projection at page 94 of 9,000 acres of agricultural land and 400 acres of forest land being converted to industrial use requires an explanation of how these figures were determined. Your projections as to future sediment loads going into Lake Verret need further explanation.

The portions of the Environmental Impact Statement dealing with fisheries and wildlife losses requires further elaboration and quantification where possible. For example, at page 107, the impact on the crayfish resources is not assessed.

The section of the statement dealing with alternatives requires elaboration. Emphasis should be given in the final document to a wide range of non-structural alternatives.

The final document should describe other Soil Conservation Service small watershed projects in the area and give the cumulative impact of these projects.

The final document should also attempt to describe the various other public and private water resource projects in the area and assess the cumulative impact of these projects as well as discussing the Lake Verret

project in relationship to the changing conditions in the Atchafalaya Floodway, the proposed Atchafalaya Center Channel Project, and other agency projects such as the Corps of Engineers Atchafalya, Chene, Bouef, and Black Project to the south of the Lake Verret Watershed Project.

The relationship to the Lake Verret project to the plans and proposals of local government should be analysed and discussed. Reference should be made to the major studies and surveys of which you are aware which relate to water resource and environmental problems in the area which includes the area of the Lake Verret Watershed Project.

The downstream flooding problem should be considered in the final statement. Particular attention should be given to the existing backwater and other flood problems in the Gibson, Amelia and Morgan City areas and the increasing flood problem due to siltation in the lower Atchafalaya.

Thanking you for this opportunity to comment, I remain,

Sincerely,

MICHAEL OSBORNE

MO/jm
11/7

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Duval Building
9450 Gandy Boulevard
St. Petersburg, FL 33702

October 19, 1977

Mr. Alton Mangum
State Conservationist
U.S. Department of Agriculture
Soil Conservation Service
P.O. Box 1630
Alexandria, LA 71301

Dear Mr. Mangum:

This is in reply to your letter of August 31, 1977, wherein you transmitted for our comments copies of a Draft Revised Environmental Impact Statement and Supplemental Watershed Work Plan Agreement for the Lake Verret Watershed, Louisiana. We have forwarded our comments on the draft revised EIS for inclusion in a Department of Commerce response under the provisions of PL-190. We have no comments to offer at this time concerning the Supplemental Watershed Work Plan Agreement.

Thank you for the opportunity to comment on these two documents.

Sincerely,

William H. Stevenson
Regional Director

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

SA

REPLY TO: 3510 Watershed Protection And Flood Prevention (PL 566) — October 20, 1977

SUBJECT: 5/77 Draft, Supplemental Work Plan and 9/77 Draft, EIS; Lake Verret Watershed, Louisiana

TO: Alton Mangum, State Conservationist
Soil Conservation Service
P. O. Box 1630
Alexandria, Louisiana 71301

We have reviewed the subject draft supplemental work plan and environmental impact statement for the Lake Verret Watershed in Ascension, Assumption, and Iberville Parishes, Louisiana.

We refer you to our memo of July 8, 1977 commenting on the previous draft and repeat our request for a change in Table 1, Page 13 of the Supplemental Work Plan, i.e.: In the Land Treatment section:

> Indent the term Fire Control; delete CFM Program and 2,500 shown three times on that same line under Estimated Cost, Other; insert 2,500 for Technical Assistance under Estimated Cost, Other, FS.

All comments made on the EIS were adequately treated and we have no further comments to make on that document.

M. W. Kageorge

M. W. KAGEORGE
Assistant Area Director
Area Planning & Management Assistance

cc: Jackson F.O.
Little Rock F.O.
WO, AP&D

APPENDIX H

	Lake Varret 1/ 4.3 Miles SE of Pierre Part, La.	Lake Verret 7 Miles SSE of Pierre Part, La.	Grassy Lake Approximate Center	Lake Palourde Approximate Center	Lake Palourde SW Corner
Dissolved Silica (SiO_2) mg/l	5.1	3.8	4.6	4.6	4.4
Dissolved Calcium (Ca) mg/l	23	25	25	27	35
Dissolved Magnesium (Mg) mg/l	7.1	6.5	6.8	7.7	7.9
Dissolved Sodium (Na) mg/l	15	16	14	14	15
Dissolved Potassium (K) mg/l	2.2	2.5	2.5	2.5	2.7
Bicarbonate (HCO_3) mg/l	104	103	99	112	121
Carbonate (CO_3) mg/l	0	0	0	0	0
Alkalinity ($CaCO_3$) mg/l	85	84	81	92	99
Dissolved Sulfate (SO_4) mg/l	12	12	12	15	18
Dissolved Chloride (Cl) mg/l	22	26	22	22	24
Dissolved Fluoride (F) mg/l	.2	.2	.2	.2	.2
Total Phosphorus (P) mg/l	.07	.08	.09	.08	.07
Dissolved Solids 2/ mg/l	158	167	154	158	176
Dissolved Solids 3/ mg/l	138	143	136	148	166
Hardness (Ca,mg) mg/l	87	89	90	99	120
Non-Carbonate Hardness mg/l	1	5	9	7	21
Specific Conductance (micromhos)	266	280	265	288	303
pH (units)	7.6	7.6	7.7	7.9	8.1
Color (Platinum-cobalt units)	22	14	24	17	17
Total Organic Carbon (C) mg/l	8.9	8.7	7.0	7.1	13
Turbidity (JTU)	6	15	15	8	10
Dissolved Oxygen mg/l	---	7.0	5.4	8.1	7.7
Biochemical Oxygen Demand (5 Day) mg/l	1.2	---	---	1.7	.8
Fecal Coliform (Col. Per 100 ml)	---	7	53	14	580
Streptococci (Col. Per 100 ml)	---	4	23	0	250
Total Arsenic (As) ug/l	2	2	2	2	2
Total Arsenic Bottom Deposits ug/g	7	6	5	9	2
Total Mercury (Hg) ug/l	.3	.2	.2	.0	.1
Total Mercury Bottom Deposits ug/g	.1	.1	.1	.1	.0

Blanks = Parameter not determined

1/ USGS Data
2/ Residue at (180°C)
3/ Sum of Constituents

PESTICIDE RESIDUE CONCENTRATIONS
Lake Verret Watershed

	PCB Arochler 1245 (ppm)	p,p'-DDDD (ppm)	p,p'-DDE (ppm)	p,p'-DDT (ppm)	Aldrin (ppm)	Chlordane (ppm)	Dieldrin (ppm)	Toxaphene (ppm)	Endrin (ppm)	Heptachlor (ppm)	H. Epoxide (ppm)	PCNB (ppm)
TATION NO. 1												
/73												
ish -												
Largemouth Bass		.03	.02	.02			.02					
Bluegill		.02	.01	.01			.01					
Striped Mullet		.01	.01	.01			.01					
ediment -		No Cl Hc detected at 1ppb										
ter -		No Cl Hc detected at 1ppb										
TION NO. 2												
/73												
sh -												
Largemouth Bass		.01	.01	.01								
Bluegill		.01	.02	.01								
Mullet Striped		.02	.01	.01			.01					
iment -		No Cl Hc detected at 1ppb										
ter -		No Cl Hc detected at 1ppb										
ATION NO. 3												
/73												
h -												
Largemouth Bass		.01	.01	.01			.02					
luegill		.02	.01	.01			.01					
Striped Mullet		.01		.01								
ediment -		No Cl Hc detected at 1ppb										
ater -		No Cl Hc detected at 1ppb										
STATION NO. 4												
/73												
ish -												
Largemouth Bass		.01	.01	.01								
Bluegill		No Cl Hc detected at 1ppb										
Sediment -		No Cl Hc detected at 1ppb										
ter -		No Cl Hc detected at 1ppb										
TION NO. 5												
/73												
-												
rgemouth Bass		.01	.01	.01								
luegill		.01	.03	.01								
hite Crappie		.02	.03	.01								
iment -		No Cl Hc detected at 1ppb										
-		No Cl Hc detected at 1ppb										
ON NO. 1												
Largemouth Bass		.04	.09	.04			.02	.05	.01			
Largemouth Bass		No Cl Hc detected at 1ppb										
Bluegill			.02				.01	.02				
luegill		No Cl Hc detected at 1ppb										
Black Crappie		.05	.06	.04			.02	.3	.02			
Black Crappie		.01	.01				.01	.4				
Mullet Striped		No Cl Hc detected at 1ppb										
iment -		No Cl Hc detected at 1ppb										
TATION NO. 2												
11/73												
Fish -												
Largemouth Bass			.04				.02	.4	.01			
Largemouth Bass		.01	.06	.04			.03	.4	.02			
Bluegill			.01					.2				
Carp			.01					.2				
Carp		No Cl Hc detected at 1ppb										
Channel Catfish		No Cl Hc detected at 1ppb										
Channel Catfish			.02					.2				
Sediment -		No Cl Hc detected at 1ppb										

Blank = Not detected at 1 ppb

	PCB Arochlor 1245 (ppm)	p,p'-DDDD (ppm)	p,p'-DDE (ppm)	p,p'-DDT (ppm)	Aldrin (ppm)	Chlordane (ppm)	Dieldrin (ppm)	Toxaphene (ppm)	Endrin (ppm)	Heptachlor (ppm)	H. Epoxide (ppm)	PCNB (ppm)
STATION NO. 3												
11/73												
Fish -												
Largemouth Bass		.02	.05	.02				.4				
Carp			.02				.01					
Carp		.02	.01				.01	.5	.01			
Largemouth Bass	.2	.04	.07	.01			.16	.2	.02			
Sediment -		No Cl Hc detected at .05 ppm										
Sediment -		No Cl Hc detected at .05 ppm										
STATION NO. 4												
11/73												
Fish -												
White Crappie									.01			
White Crappie		No Cl Hc detected at 1ppb										
Striped Mullet		No Cl Hc detected at 1ppb										
Striped Mullet						.02						
Cizzard Shad								.4	.01			
Cizzard Shad		.01						.2				
Sediment -						.05						
STATION NO. 5												
11/73												
Fish -												
Bluegill								.2				
Bluegill		.02	.01					.1				
Carp		No Cl Hc detected at 1ppb										
Carp		.01	.01					.2				
Gar			.04									
Car		.02	.03					.2	.01			
Cizzard Shad		.02	.04				.01	.5	.02			
Cizzard Shad		.04	.02				.01	.5	.03			
Sediment -		No Cl Hc detected at 1ppb										
STATION NO. 1												
6/74												
Fish -												
Largemouth Bass			.01									
Bluagill			.05	.01			.01	.5				
Striped Mullet		.01	.02	.01								
Sediment -					.15		.05					
STATION NO. 2												
6/74												
Fish -												
Largemouth Bass		.01	.02	.01								
Bluegill		.03	.05									
Striped Mullet			.01									
Sediment -		.02	.02							.02		
STATION NO. 3												
6/74												
Fish -												
Largemouth Bass		.01	.02									
Bluegill		.01	.03	.01								
Striped Mullet		No Cl Hc detected at 1ppb										
Sediment -		No Cl Hc detected at 1ppb										
STATION NO. 4												
6/74												
Fish -												
Largemouth Bass			.01									
Bluegill			.03	.01							.05	
Striped Mullet		.02	.02								.05	
Sediment -			.01							.01		
STATION NO. 5												
6/74												
Fish -												
Bowfin		.01	.02						.01		.02	
Bluegill		.02	.02									
Cizzard Shad			.02									
Sediment -					.04		.02			.01		
STATION NO. 1												
11/74												
Fish -												
Largemouth Bass		.02	.04	.02			.03	.46	.02			
Bluegill		.01	.02	.03			.01	.18				
Carp		.02	.03	.02			.02	.32	.01			
Sediment -		No Cl Hc detected at 1ppb										

Blank = Not detected at 1 ppb

	PCB Arochler 1245 (ppm)	p,p'-DDDD (ppm)	p,p'-DDE (ppm)	p,p'-DDT (ppm)	Aldrin (ppm)	Chlordane (ppm)	Dieldrin (ppm)	Toxaphene (ppm)	Endrin (ppm)	Heptachlor (ppm)	H. Epoxide (ppm)	PCNB (ppm)
STATION NO. 2												
11/74												
Fish -												
Largemouth Bass			.02	.02				.16				
Bluegill		No Cl Hc detected at 1ppb										
Carp			.02									
STATION NO. 3												
11/74												
Fish -												
Largemouth Bass		No Cl Hc detected at 1ppb										
Bluegill		No Cl Hc detected at 1ppb										
Striped Mullet								.15				
Sediment -		No Cl Hc detected at 1ppb										
STATION NO. 4												
11/74												
Fish -												
Largemouth Bass		.01					.01	.32	.01			
Carp			.03					.50	.01			
Striped Mullet								.21			.02	
STATION NO. 5												
11/74												
Fish -												
Channel Catfish			.02					.24				
Gizzard Shad			.02					.25				
Sediment -				.01								
STATION NO. 1												
6/75												
Fish -												
Bluegill			.02					.10				
Yellow Bass			.04	.03			.01	.50				
Gizzard Shad			.01					.10				
Sediment -												.02
STATION NO. 2												
6/75												
Fish -												
Bluegill		No Cl Hc detected at .01 ppm										
Carp		.01	.01					.13				
Largemouth Bass								.08				
Striped Mullet		.01	.03	.02				.25				
Sediment -												.04
STATION NO. 3												
6/75												
Fish -												
Bluegill		.01	.02					.14				
Largemouth Bass		.01	.02					.14				
Gizzard Shad								1.6				
Sediment -		No Cl Hc detected at .01 ppm										
STATION NO. 4												
6/75												
Fish - Channel Catfish									.2			
Bluegill								.2				
Gizzard Shad								.3				
Sediment -		No Cl Hc detected at .01 ppm										
STATION NO. 5												
6/75												
Fish -												
Carp								.07				
Channel Catfish								.15				
Gizzard Shad								.1				
Sediment -									.01			
STATION NO. 1												
8/75												
Fish -												
Bluegill		No Cl Hc detected at .01 ppm										
Sediment -		.02	.01									.02

Blank = Not detected at 1 ppb

	PCB Arochler 1245 (ppm)	p,p'-DDDD (ppm)	p,p'-DDE (ppm)	p,p'-DDT (ppm)	Aldrin (ppm)	Chlordane (ppm)	Dieldrin (ppm)	Toxaphene (ppm)	Endrin (ppm)	Heptachlor (ppm)	H. Epoxide (ppm)	PCNB (ppm)
STATION NO. 2												
8/75												
Fish -												
Largemouth Bass			.02									
Bluegill		No Cl Hc detected at .01 ppm										
Cizzard Shad			.01									
Sediment -												.02
STATION NO. 3												
8/75												
Fish -												
Largemouth Bass		.02	.04	.02				.17				
Bluegill			.01									
Cizzard Shad								.08				
Sediment		.15										.02
STATION NO. 4												
8/75												
Fish -												
Cizzard Shad		No Cl Hc detected at .01 ppm										
Carp			.03					.34				
Sediment -												
STATION NO. 5												
8/75												
Fish -												
Cizzard Shad			.01					.13				
Carp			.02					.15				
Cannel Catfish			.05					.36				
Sediment			.01									

Results have not been received from laboratory

Blank = Not detected at 1 ppb

PESTICIDE USAGE SURVEY OF

Lake Verret Watershed 1/

1973

PESTICIDE	Application rate/acre	Acres receiving application	No. of applications/year	Percent of total farms using listed pesticides	Volume of pesticide applied year
HERBICIDE					
SUGARCANE:					
Amitrole - T	(for ditch maintenance on 5,000 acres of cropland (1 gal/200 gal of Water)				
Asulox	1 lb/ac	2,540	1	28	2,540 lbs
Dalapon	2 lbs/ac	3,675	2	28	14,700 lbs
Dalapon	3 lbs/ac	2,500	2	14	1,500 lbs
Dalapon - Silvex	1.5 lbs/ac	700	1	14	1,050 lbs
Fenac Plus	1 gal/ac	5,600	2	42	11,200 gals
Fenac - Silvex	.25 gal/ac	2,500	2	14	1,250 gals
MSMA	1 lb/ac	1,175	2	14	2,350 lbs
MSMA - 2, 4-D	(for ditch maintenance on 1,300 acres of cropland (.5 gal/ac of ditch)				
MSMA - 2, 4-D	.5 gal/ac	5,000	2	28	5,000 gals
Silvex	.25 gal/ac	4,545	1	42	1,136 gals
Sinbar	.66 lb/ac	3,785	2	70	2,498 lbs
TCA	7 lbs/ac	3,675	2	28	51,450 lbs
TCA-LV4	.2 gal/ac	2,500	1	14	500 gals
2,4-D	.25 gal/ac	7,745	1	70	1,936 gals
2,4-D Amine	1.5 /ac	600	1	14	900
INSECTICIDES					
SUGARCANE:					
Azodrin	.75 lb/ac	1,175	1	14	881 lbs
Guthion	.75 lb/ac	8,875	2	100	13,178 lbs

1/ Number of farms surveyed = 7
Number of acres surveyed = 3,785
Number of flying services surveyed = 1
Number of acres in sugarcane surveyed = 8,785

Degradation Times for Pesticides Used in Lake Verret Watershed

Herbicides	Time for Greater Than 90% Dissipation in Soil
Amitrole-T	3-5 weeks
Asulox	2-3 months
Dalapon	2-3 months
Dalapon-Silvex	2-8 months
Fenac Plus	10-12 months
Fenac-Silvex	6-12 months
MSMA	?
MSMA-2, 4-D	?
Silvex	6-8 months
Sinbar	8-12 months
TCA	2-3 months
TCA-LV4	2-8 months
2, 4-D	6-8 months
Insecticides	
Azodrin	2-3 months
Guthion	2-3 months

Sources: 1. J. F. Parr and G. H. Willis, Unpublished Report, 1975.
2. U. S. Environmental Protection Agency, 1976. Loading Functions For Assessment of Water Pollution From Non-point Sources. Office of Research and Development, Washington, D. C.

Toxicity of Selected Pesticides Used In the Lake Verret Watershed on Various Fish Species[a]

Compound	Organism	Toxicity, Active Ingredient ppm
Guthion	Ictalurus punctatus	3.29 (T_4)
Guthion	Cyprinus carpio	0.695 (T_4)
Guthion	Lepomis macrochirus	0.022 (T_4)
Guthion	Micropterus salmoides	0.005 (T_4)
Amitrol-T	Lepomis macrochirus	Greater than 100.0 (T_2)
Asulox	Lepomis macrochirus	5,000.0 (24 hr. LC_{50})
Dalapon	Fish-several species	Greater than 100.0 (LC_{50})
Fenac	Lepomis macrochirus	19.0 (T_2)
2-4-D	Micropterus salmoides	100.0 (some mortality)
Silvex	Lepomis Macrochirus	70.0 (T_2)
Sinbar	Lepomis sp.	86.0 (24 hr. TLm)

TCA (For flathead minnow, there was 0 mortality after 72 hours exposure at 100 ppm.)

[a] Data based on information contained in:
(1) EPA - Water Quality Criteria Data Book, Volume 5, Effects of Chemicals on Aquatic Life
(2) Herbicide Handbook of the Weed Science Society of America

Abreviations defined:

T_4 - 96-hour TLm (median tolerance limits)
T_2 - 48-hour TLm
LC_{50} - Median lethal concentration

APPENDIX I

WATER QUALITY CRITERIA FOR LAKE VERRET AND GRAND BAYOU[1/]

GENERAL CRITERIA:

The following general criteria are applicable to the surface waters of the State of Louisiana and specifically apply with respect to substances attributed to waste discharges or the activities of man as opposed to natural phenomena.

Natural waters may, on occasion, have characteristics outside the limits established by these criteria, in which case these criteria do not apply. The criteria adopted herein relate to the condition of water as affected by waste discharges or man's activities.

These general criteria do not superseded specific exceptions to any one or more of the following if the exception is specifically stated in a specific water quality standard. All waters of the State shall be capable of supporting desirable diversified aquatic life.

(1) AESTHETICS - The present and future use of all streams and water bodies considered in these criteria. The waters of the State shall be maintained in an aesthetically attractive condition and shall meet the generally accepted aesthetic qualifications.

(2) COLOR - True color shall not be increased to the extent that it will interfere with present usage and projected future use of the streams and water bodies.

(3) FLOATING, SUSPENDED AND SETTLEABLE SOLIDS - Free from substances that will produce ditinctly visible turbidity, solids, or scum, nor shall there by any formation of slimes, bottom deposits, or sludge banks attributable to waste discharge from municipal, industrial, or other sources including agricultural practices.

(4) TASTE AND ODOR - Taste- and odor-producing substances shall be limited to concentrations in the waters of the State that will not interfere with the production of potable water by reasonable water

treatment methods, or impart unpalatable flavor to food fish, including shellfish, or result in offensive odors arising from the waters, or otherwise interfere with the reasonable use of the waters.

(5) TOXIC SUBSTANCES - None present in quantities that alone or in combination will be toxic to animal or plant life. In all cases the level should not exceed the $TLM_{96/10}$. Bioassay techniques will be used evaluating toxicity utilizing methods and species of test organisms suitable to the purpose at hand. In cases where the stream is used as a public water supply, the level of toxic substances shall not exceed the levels established by the United States Public Health Service drinking water standards latest edition.

(6) OILS AND GREASES - There shall be no free or floating oil or grease present in sufficient quantities to interfere with the designated uses, nor shall emulsified oils be present in sufficient quantities to interfere with the designated uses.

(7) FOAMING OR FROTHING MATERIALS - None of a persistent nature.

(8) NUTRIENTS - The naturally occurring nitrogen-phosphorous ratio shall be maintained. On completion of detailed studies on the naturally occurring levels of the various macro and micro nutrients the State will establish numerical limits on nutrients where possible.

WATER QUALITY CRITERIA

Specific Criteria	WATER USES				CRITERIA						
Segment Description	Primary Contact Recreation	Secondary Contact Recreation	Propagation of Fish and Wildlife	Domestic Raw Water Supply	Chloride (mg/l) Not to exceed	Sulphate (mg/l) Not to exceed	Dissolved Oxygen (mg/l) Not less than	pH Range	Bacteria Standard	Temperature °C	Total Dissolved Solids(mg/l) Not to exceed
Lake Verret	X	X	X		100	75	5.0	6.0-8.5	1	32	350
Grand Bayou		X	X		250	75	5.0	6.0-8.5	2	32	500

APPENDIX J

INTERPRETATIONS OF WATER QUALITY PARAMETERS

CHLORIDE (Cl)

Water quality is dependent upon the use(s) of the water. The following data is not all inclusive but summarizes water quality criteria for some common uses.

Chloride is found in natural waters. It may originate from natural mineral origin or from (1) seawater contamination of underground water supplies, (2) salts spread on roads and bridges, (3) human or animal sewage, and (4) industrial effluents such as those from paper works, water softening plants, oil wells, and petroleum refineries. It is recommended that the chloride concentration not exceed a monthly average of 125 mg/1 and that the maximum concentration not exceed 250 mg/1. The primary concern in setting these standards is economic damage rather than public health. For public supplies, water with a chloride concentration of less than 125 mg/1 is rated "acceptable"; between 125 and 250 mg/1 "doubtful"; and over 250 mg/1 "unsatisfactory." For industrial use, the corresponding limits are: less than 50 mg/1, 50-175 mg/1, and over 175 mg/1, respectively.

"The Aquatic Life Advisory Commission of ORSANCO concluded that it is impossible to generalize on the effects of chloride concentrations on aquatic life, because each mixture of chlorides with other salts must be evaluated separately. Hart, et al., cite data indicating that among United States waters supporting a good fish fauna, ordinarily the concentration of chlorides is below 3 mg/l in 5 percent; below 9 mg/l in 50 percent; and below 170 mg/l in 95 percent of such waters."1/

In summary, it appears that the following chloride concentrations will not normally be deleterious to the specified use: (1) Domestic water supply, 125 mg/l; (2) Industrial water supply, 50 mg/l; (3) Irrigation water, 100 mg/l; and (4) Stock and wildlife, 1,500 mg/l.

1/ Jack Edward McKee and Harold W. Wolf, Water Quality Criteria, publication No. 3-A, (2nd edition; Sacramento: State Water Quality Board, 1963) p. 161.

COLOR (APPARENT)

Color of natural waters is derived from substances in solution or from materials in colloidal state.2/ The standard unit used to measure color is the amount of color produced by adding 1 mg/l of platinum to water. Results are expressed as units of color. "Color in excess of 50 units may limit photosynthesis and have a deleterious effect upon aquatic life, particularly phytoplankton and the benthos."3/

DISSOLVED SOLIDS

Water without some dissolved solids does not occur in nature and will not support aquatic life. Natural water contains an endless variety of dissolved materials in concentrations that will vary widely from place to place and from time to time. Some commonly occurring dissolved solids are: carbonates; bicarbonates; chlorides; sulfates; phosphates; nitrates of calcium, magnesium, sodium, and potassium; and traces of iron, manganese, and other elements. Many of these dissolved solids are essential to aquatic organisms for their growth, reproduction, and general well-being. All dissolved solids, which are necessary to aquatic organisms, have a range of concentrations that are both essential and tolerable. The tolerance levels for any one dissolved solid varies depending on the concentrations and kinds of other substances present. In general, the concentrations of dissolved materials in natural freshwaters are below the optimum for maximum productivity. In many instances, the addition of any of a large number of substances would be beneficial. However, the addition of what may be considered a beneficial substance must be planned and controlled so that it will not exceed favorable limits.4/ It is believed that the total dissolved solids in a water course should not be increased more than one-third of the concentration it has under natural conditions.

Dissolved solids may influence the toxicity of heavy metals and organic compounds to fish and other forms of aquatic life. This is a result primarily of the counteracting effect of hardness producing metals. "It has been reported that among inland waters in the United States supporting a good mixed fish fauna, about 5 percent have a dissolved solids concentration under 72 mg/l, about 50 percent under 169 mg/l, and about 95 percent under 400 mg/l."5/

2/ George K. Reid, Ecology of Inland Waters and Estuaries, (New York: Reinhold Publishing Corporation, 1961), p. 101.

3/ U.S. Department of the Interior, Federal Water Pollution Control Administration, Water Quality Criteria, (Washington: U.S. Government Printing Office, 1972), p. 48.

4/ Ibid., p. 39.

5/ McKee and Wolf op. cit., p. 183.

In summary, based on a literature review, dissolved solids up to the following limits should not interfere with the indicated use: (1) Domestic water supply, 1,000 mg/1; (2) Irrigation water, 700 mg/1; (3) Stock and wildlife water, 2,500 mg/1; and (4) Freshwater fish and aquatic life, 2,000 mg/1.

HARDNESS

Hardness or calcium carbonate determinations are made with the Titration Method and expressed as mg/1. "In natural waters, hardness is a characteristic of water which represents the total concentration of just the calcium and magnesium ions expressed as calcium carbonate."6/ Hardness in water may be caused by the natural accumulation of salts from contact with soil and geological formations, or it may enter from direct pollution by industrial wastes. Hardness of waters is not considered a problem for fisheries in Louisiana. As a guide interpreting hardness, less than 40 mg/1 is considered soft water 90-150 mg/1 is medium, while above 150 mg/1 is considered hard water.

NITROGEN, AMMONIA (NH_3)

Nitrogen is present in natural waters in the form of an inorganic compound such as ammonia. Nitrogen, (ammonia) determination are made by the Nessler method and expressed in mg/1. The chemical state of nitrogen is dependent on the overall limnological conditions of the waterway since nitrogen, (ammonia) is quite unstable. In most freshwaters, the concentrations of this inorganic compound are relatively slight, but nevertheless, very important in determining the productivity of a given community. "Rivers known to be unpolluted have low ammonia concentrations, generally less than 0.2 mg/1 as N."7/

NITROGEN, NITRATE (NO_3)

Nitrogen, (nitrate) determinations are made by the Cadmium Reduction Method and expressed in mg/1. "Nitrogen, (nitrate) usually occurs in relatively small concentrations in unpolluted freshwater, the world average being 0.30 ppm."8/ Under normal conditions, the amount of nitrate in solution at a given time is determined by metabolic processes in the body of water, i.e., production and decomposition of organic matter. High nitrate concentrations in effluents and water stimulate the growth of plankton and aquatic weeds. By increasing plankton growth and the development of fish food organisms, nitrates indirectly foster increased fish production.

6/ U.S. Department of the Interior, Federal Water Pollution Control Adminstration, Chemical Analysis for Water Quality, 1967, p. 18-1.

7/ McKee and Wolf, op. cit., p. 132.

8/ Reid, op. cit., p. 187

"Hart, et al., report references to the effect that among United States' waters supporting a good fish life, ordinarily 5 percent have less than 0.2 mg/l of nitrates; 50 percent have less than 0.9 mg/l; and 95 percent have less than 4.2 mg/l."9/

OXYGEN (DISSOLVED (O_2)

The dissolved oxygen content can be determined with a Hach Dissolved Oxygen test kit and expressed in mg/l. The content of dissolved oxygen in the water depends on several factors such as the temperature and salinity of the water, amount of organic material present, light present, and the abundance of phytoplankton. "For a diversified warm-water biota, including game fish, dissolved oxygen concentrations should be above 5 mg/l, assuming normal seasonal and daily variations are above this concentration. Under extreme conditions, however, they may range between 5 and 4 mg/l for short periods during any 24-hour period, provided that the water quality is favorable in all other respects."10/

OXYGEN SATURATION (Percent)

Water is said to be saturated with oxygen when it contains all the dissolved oxygen it can hold at a given atmospheric pressure, temperature, and dissolved solids concentration. The difference between the actual oxygen content and the amount that could be present is called the saturation deficit. If the water contains more oxygen than should normally be present, it is said to be super-saturated. The ability of water to hold oxygen decreases with increases in temperature, dissolved solids, and reduction of atmospheric pressure.11/ Natural waters are seldom at equilibrium or exactly saturated with dissolved oxygen. The reason for this is that temperatures and atmospheric pressure are always changing and physical, chemical, bio-chemical, and/or biological activities are continually utilizing or producing dissolved oxygen.

Oxygen saturation, like pH and alkalinity, is only a measurement, but it indicates the amount of potential oxygen actually present. High or low oxygen saturation values usually indicate high or low concentrations of dissolved oxygen, but this is not always the case. For instance, seawater at

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9/ McKee and Wolf, op. cit., p. 225.

10/ U.S. Department of the Interior, Federal Water Pollution Control Administration, Water Quality Criteria, (Washington: U.S. Government Printing Office, 1972), p. 44.

11/ Charles W. Keenan and Jesse H. Wood, General College Chemistry (2nd ed.; New York, Evanston, London: Harper and Row, Publishers, 1957).

15 degrees centigrade and 100 percent saturation will contain only 6 ppm dissolved oxygen while freshwater at 15 degrees centigrade and 100 percent saturation will contain 11 ppm dissolved oxygen.12/

In natural waters, oxygen saturation is usually between 70 and 120. Reading below this range usually indicates pollution which is utilizing the available oxygen and/or inhibiting the biological production of additional oxygen. Readings above this range usually come in mid to late afternoon on warm, sunny days, and indicate excessive photosynthesis activity by green plants in the water.

pH

The pH can be determined with a Hach test kit. The symbol "pH" is used to designate the logarithm (base 10) of the reciprocal of the hydrogen-ion concentration. If the value is less than 7, then the pH is considered acid and the lower the number the more acid. Values above 7 indicate a basic solution with the larger number being more basic. "In most productive, fresh, natural water, the pH falls in the range between 6.5 and 8.5 (except when increased by photosynthesis activity)."13/ "Bass and bluegill can live from 4.6 to 11; growth and reproduction at either extreme is poor. The optimum level for growth for these fish is 6.5 to 8.5."14/

PHOSPHATE, ORTHO (PO_4)

The Orthophosphate determinations were made by the Ascorbic Acid Method which gives a reading in mg/1. This is a test for just orthophosphates and does not indicate total phosphate content. The major sources of phosphorus entering freshwaters are domestic sewage effluents (including detergents), animal and plant processing wastes, fertilizer and chemical manufacturing spillage, various industrial effluents, and to a limited extent, sediment materials in agricultural runoff. "Phosphorus is stored in plankton and bottom sediments. Very little of this stored phosphorus reenters the water. Evidence from the addition of fertilizers to fish ponds

12/ George K. Reid, Ecology of Inland Waters and Estuaries (New York: Reinhold Publishing Corporation, 1961).

13/ U.S. Department of the Interior, Federal Water Pollution Control Administration, Water Quality Criteria, (Washington: U.S. Government Printing Office, 1972), p. 40.

14/ U.S. Department of Agriculture, Soil Conservation Service, "Water Quality and Fish Culture," Biology Technical Note XII, 1968.

and from what is known about the eutrophication of lakes by sewage supports the view that phosphorus plays a major role in production."15/ "Most natural waters contain relatively low levels of phosphorus (0.01 to 0.05 mg/l) in the soluble state during periods of significant productivity."16/ "Optimum growth of all organisms studies in cultures can be obtained on concentrations from 0.09 to 1.8 mg/l of phosphorus while a limiting effect on all organisms will occur in phosphorus concentrations from 0.009 mg/l downward. The lower limit of optimum range of phosphorus concentration varies from about 0.018 to about 0.09 mg/l; and the upper limit from 8.9 to 17.8 mg/l."17/

SODIUM (Na)

Sodium is a very active metal which does not occur free in nature. Neverthe less, sodium compounds make up 2.8 percent of the earth's crust. Most sodium salts are extremely soluble in water. Because of this, any sodium that is leached from soil or discharged into streams by industries will normally remain in solution. Sodium is the cation of many salts used in industry and is one of the most common ions in process wastes.

Sodium in drinking water may be harmful to people suffering from cardiac, renal, and circulatory diseases. Drinking water of good quality may contain up to 115 mg/l of sodium, but it is recommended that a limit of 10 mg/l be established for drinking water and 50 mg/l for industrial water. Water used by livestock and wildlife should not have sodium concentrations greater than 2,000 mg/l.

"Of the United States' waters supporting a good fish fauna, originally the concentration of sodium plus potassium is less than 6 mg/l in about 5 percent, less than 10 mg/l in about 50 percent, and less than 85 mg/l in about 95 percent."18/

15/ U.S. Department of the Interior, Federal Water Pollution Control Administration, The Practice of Water Pollution Biology, Division of Technical Support, 1969, p. 40.

16/ U.S. Department of the Interior, Federal Water Pollution Control Administration, Chemical Analysis for Water Quality, 1967, p. 15-1.

17/ S. P. Chu, "The Influence of the Mineral Composition of the Medium on the Growth of Planktonic Algae," Journal of Ecology, 31(2), 1943, pp. 109-148.

18/ McKee and Wolf, op. cit., p. 259.

SPECIFIC CONDUCTANCE

Specific conductance is an indication of the ion concentration in water. Natural freshwater usually contains relatively small amounts of ions in solution, but in water polluted by brines and various chemical wastes the ion concentration may rise to levels that are harmful to living organisms because of the increase in osmotic pressure.

All substances in solution collectively exert osmotic pressure on the organisms living in it. Most aquatic species can tolerate some changes in the amount of ions naturally present if the total maximum concentration is not exceeded. Wide variations in total salinity (specific conductance) or in the concentration of individual salts can have profound effects upon the aquatic fauna, resulting in the elimination of some or all aquatic species. When the osmotic pressure is sufficiently high because of ions in solution (high specific conductance), water will be drawn from the gills and other delicate external tissues causing considerable damage or even death. High concentrations of many types of pollutants of freshwater present this danger apart from any other toxic or corrosive effects they may have.19/

"Ellis has concluded that conductances in excess of 1,000 mhos x 10^{-6} at 25 degrees centigrade in most types of streams are probably indicative of the presence of acid or salt pollution of various kinds. Ellis has also found that a specific conductance of 4,000 x 10^{-6} mhos at 25 degrees centigrade is approximately the upper limit of ionizable salts tolerated by fish.

Using Ellis' data, Hart, *et al.*, have reported that among United States' waters supporting a good fish fauna, about 5 percent have a specific conductance under 50 x 10^{-6} mhos at 25 degrees centigrade, about 50 percent under 270 x 10^{-6} mhos, and about 95 percent under 1,100 x 10^{-6} mhos."20/

SULFATE (SO_4)

Sulfate content can be analyzed by the Turbidimetric Method and expressed in mg/l. Sulfates occur naturally in waters as a result of leachings from gypsum and other common minerals. "Sulfate is ecologically important in natural waters in several ways. It

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19/ *Ibid.*, p. 94.

20/ *Ibid.*, p. 274.

is apparently necessary for plant growth; short supply of the material can inhibit the development of phytoplankton populations and, therefore production. Sulfur is important in protein metabolism and is supplied to the organism originally as sulfate."21/ "In United States waters that support good game fish populations, 5 percent of the waters contain less than 11 mg/l of sulfates, 50 percent less than 32 mg/l, and 95 percent less than 90 mg/l. Experiments indicate that water containing less than 0.5 mg/l of sulfate will not support growth of algae."22/

SULFIDE (S)

Sulfides are determined by the Methylene Blue Method and expressed in mg/l. Sulfides in water are a result of the natural processes of decomposition, sewage, and industrial wastes such as those from oil refineries, tanneries, pulpmills, papermills, textile mills, chemical plants, and gas manufacturing facilities.

"The toxicity of solutions of sulfides toward fish increase as the pH value is lowered, i.e., the H_2S or HS, rather than the sulfide ion, appears to be the toxicity principle."23/ "Concentrations in the range of less than 1.0 mg/l to 25.0 mg/l are lethal in 1 to 3 days to freshwater fish."24/

SUSPENDED SOLIDS

Suspended solids consist normally of sediment, organic detritus, bacteria, and plankton in natural waters. The standard method of determining the suspended solids content of a water source is by use of the Photometric Method which gives a direct reading of mg/l of suspended solids. The test is not intended to measure the concentrations of specific chemical substances in water, but rather give an empirical estimate of water quality be measuring the amount of suspended foreign materials present. Suspended solids

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21/ George K. Reid, op. cit., p. 195.

22/ Mckee and Wolf, op. cit., p. 276.

23/ Ibid., p. 277.

24/ U.S. Department of the Interior, Federal Water Pollution Control Administration, Water Quality Criteria, (Washington: U.S. Government Printing Office, 1972), p. 88.

may kill some species of fish and shellfish if exposed to concentrations of 100-200 mg/l for long-term periods.25/

TEMPERATURE

Temperature is an important, and sometimes critical water quality parameter. Water temperature changes can result from natural climatic phenomena or from man's activities. For instance, "stream temperatures may be increased by irrigation practices and the return of agricultural drainage."26/

Water temperature changes resulting from man's activities are generally upward. Increases in temperature usually cause some or all of the following: (1) lowers the solubility of dissolved oxygen, thereby reducing the availability of this essential gas, (2) higher temperatures increase the rate of metabolism and respiration and thus the oxygen demand of fish and other aquatic life; therefore, the oxygen demand is increased while the oxygen supply is decreased, (3) intensifies the toxicity of many substances, (4) higher temperatures favor the growth of sewage fungus and the putrefaction of sludge deposits which is detrimental to desirable fishes, (5) there is a maximum and minimum temperature that each species can tolerate; therefore, changes in temperature may cause a change in species composition; (fish tolerance to temperature extremes and changes vary with fish species, prior acclimatization, oxygen availability, and the synergistic effects of other pollutants) and (6) changes in temperature also affects lower aquatic life. Temperature is one of the environmental features that determines which organisms will thrive, diminish, or be eliminated.27/

To maintain a well-rounded warm-water fishery population, the following recommendations were made on temperature extremes and temperature increases.

1. "During any month of the year, heat should not be added to a stream in excess of the amount that will raise the temperature of the water (at the expected minimum daily flow for that month) more than 5 degrees Fahrenheit. In lakes and reservoirs, the tmeperature of the epilimnion should not be raised more than 3 degrees Fahrenheit above that which existed before the addition of heat of artificial origin. The increase should be based on the monthly average of the maximum daily temperature.

25/ McKee and Wolf, op. cit., p. 280.

26/ Ibid., p. 283.

27/ Ibid., p. 285.

2. The normal daily and seasonal temperature variations that were present before the addition of heat, because of other than natural causes, should be maintained.

3. The recommended maximum allowable temperatures are not to exceed the maximum temperatures of the preferred fish species and their associated biota."28/

TOTAL ALKALINITY

Alkalinity is not a specific polluting substance, but rather a combined effect of several substances and conditions. It is actually a measurement of the power of a solution to neutralize hydrogen ions. It is usually expressed in terms of an equivalent amount of calcium carbonate, $CaCO_3$. Alkalinity is caused by the presence of carbonates, bicarbonates, hydroxides, and to a lesser extent by borates, silicates-phosphates, and organic substances. Total alkalinity is related to pH but high pH values do not necessarily mean high total alkalinity values. High total alkalinity vlaues indicate a buffered water shich woild be resistant to rapid, wide changes in pH. For instance, water with a pH of 7.0 can have a low total alkalinity value, whereas a buffered water with a pH of 6.0 can have a higher total alkalinity value.

Alkalinity itself is not considered harmful to humans but it is usually associated with high pH, hardness, and excessive dissolved solids, all of which may be harmful. For industrial use, high total alkalinity can be either beneficial or detrimental depending upon the type of industry.

Water to be used by livestock and wildlife for drinking should have a total alkalinity below 170 mg/l. Animals drinking water with higher values develop diarrhea. For fish and other aquatic life, alkalinity is not lethal to fully developed fish if the concentration is not enough to raise the pH well above 9.0.

The best waters for supporting a productive, diversified fish population and other aquatic life are those with pH values between 7 and 8 and having a total alkalinity of 120 mg/l or more. This alkalinity acts as a buffer to help prevent sudden changes in pH which could be harmful to fish and other aquatic life.29/

28/ U.S. Department of the Interior, Federal Water Pollution Control Administration, Water Quality Criteria, (Washington: U.S. Government Printing Office, 1972), p. 42.

29/ McKee and Wolf, op. cit., p. 129.

For waterfowl, waters with relatively high bicarbonate alkalinity produce more high value food plants than those with low such values. "Few waters with less than 25 mg/l bicarbonate alkalinity can be classed among the better waterfowl habitat."30/ Bicarbonate increases the amount of CO_2 available for plant use in photosynthesis.

TURBIDITY

Turbidity is the term used to describe the degree of translucence produced in water by suspended particulate matter. Excessive turbidity reduces light penetration in to the water and, therefore, reduces photosynthesis by phytoplankton organisms, attached algae, and submersed vegetation. Turbidity calibrations were originally based on the Jackson Candle Turbidimeter with results expressed in Jackson Turbidity Units (JTU). As the Jackson equipment lacks sensitivity below 25 JTU (most treated water ranges from 0 to 5 JTU), the meter scale calibrations have been based on a uniform milky polymer called formazin, which allows accurate calibrations over a wide range. The results are expressed as Formazin Turbidity Units (FTU) and are equivalent to the Jackson Units. According to Buck "maximum production of 161.5 lbs/acre occurred in farm ponds where the average turbidity was less than 25 FTU. Between 25 and 100 FTU fish yield dropped 41.7 percent to 94 lbs/acre, and in muddy ponds where turbidity exceeded 100 FTU, the yield was only 29.3 lbs/acre, or 18.2 percent of clear ponds."31/

30/ U.S. Department of the Interior, Federal Water Pollution Control Administration, Water Quality Criteria, (Washington: U.S. Government Printing Office, 1972), p. 94.

31/ Ibid., p. 46.

APPENDIX K

Lake Verret Watershed
EPA Eutrophication Survey - 1974

Parameter	Number Samples	Mean	Maximum	Minimum	Beginning Date	End Date
Station 221601						
Temperature (°C)	6	33	76	16	3-21-74	11-14-74
Turbidity (% Trans.)	6	65	84	45	3-21-74	11-14-74
Conductivity (umhos/cm^2)	6	262	311	240	3-21-74	11-14-74
Diss. Oxygen (mg/l)	5	7	8	3	3-21-74	11-14-74
pH (units)	6	8.2	9.5	7.1	3-21-74	11-14-74
Total Alkalinity (mg/l $CaCO_3$)	3	82	93	75	3-21-74	5-29-74
Nitrite & Nitrate (mg/l N)	3	.10	.13	.05	3-21-74	5-29-74
Phosphate (mg/l P)	3	.17	.19	.14	3-21-74	5-29-74
Chlorophyl (ug/l A)	4	31	57	3	3-21-74	11-14-74

Parameter	Number Samples	Mean	Maximum	Minimum	Beginning Date	End Date
Station 221602						
Temperature (°C)	3	27	29	23	3-21-74	8-21-74
Turbidity (% Trans.)	3	38	43	28	3-21-74	8-21-74
Conductivity (umhos/cm^2)	3	245	246	244	3-21-74	8-21-74
Diss. Oxygen (mg/l)	3	5	7	4	3-21-74	8-21-74
pH (units)	3	7.6	7.8	7.4	3-21-74	8-21-74
Total Alkalinity (mg/l $CaCO_3$)	1	100	100	100	3-21-74	3-21-74
Nitrite & Nitrate (mg/l N)	1	.07	.07	.07	3-21-74	3-21-74
Phosphate (mg/l P)	1	.19	.19	.19	3-21-74	3-21-74
Chlorophyl (ug/l A)	2	65	118	12	3-21-74	8-21-74

Parameter	Number Samples	Mean	Maximum	Minimum	Beginning Date	End Date
Station 221603						
Temperature (°C)	8	24	30	16	3-21-74	11-14-74
Turbidity (% Trans.)	8	56	83	41	3-21-74	11-14-74
Conductivity (umhos/cm^2)	8	244	257	229	3-21-74	11-14-74
Diss. Oxygen (mg/l)	6	7	10	6	3-21-74	11-14-74
pH (units)	8	8.7	9.5	7.9	3-21-74	11-14-74
Total Alkalinity (mg/l $CaCO_3$)	4	80	84	76	3-21-74	5-29-74
Nitrite & Nitrate (mg/l N)	4	.06	.07	.05	3-21-74	5-29-74
Phosphate (mg/l P)	4	.13	.14	.13	3-21-74	5-29-74
Chlorophyl (ug/l A)	4	67	132	13	3-21-74	11-14-74

Parameter	Number Samples	Mean	Maximum	Minimum	Beginning Date	End Date
Station 221604						
Temperature (°C)	7	24	30	17	3-21-74	11-14-74
Turbidity (% Trans.)	7	54	81	27	3-21-74	11-14-74
Conductivity (umhos/cm^2)	7	251	272	224	3-21-74	11-14-74
Diss. Oxygen (mg/l)	6	8	10	7	3-21-74	11-14-74
pH (units)	7	8.8	9.6	8.1	3-21-74	11-14-74
Total Alkalinity (mg/l $CaCO_3$)	3	85	95	78	3-21-74	5-29-74
Nitrite & Nitrate (mg/l N)	3	.08	.10	.06	3-21-74	5-29-74
Phosphate (mg/l P)	3	.13	.15	.11	3-21-74	5-29-74
Chlorophyl (ug/l A)	4	87	198	16	3-21-74	11-14-74

APPENDIX L

CHANNEL WORK BY REACHES

Channel	Station	Inventory of Channel Work 1/ Type of Work	Type Chan. Before Proj.	Flow Cond. Before Proj.
M-1	0+74	VI	M	S
	30+00	VI	M	S
M-1 East	0+00	VI	M	S
	34+74	VI	M	S
L-1A	48+82	II	M	S
	0+00	II	M	S
L-1B	170+89	II	M	E
	78+87	II	M	E
	0+00	II	M	S
L-1B1	67+28	II	M	S
	0+00	II	M	S
L-1B2	34+09	II	M	E
	0+00	II	M	E
M-2	260+10	II	M	S
	220+00	II	M	S
	122+47	VI	M	S
	100+00	VI	M	S
M-20	214+00	I	O	E
	150+00	I	O	E
	85+00	II	M	S
L-20A	68+00	II	M	S
	0+00	II	M	S
L-20A1	21+64	I	O	E
	0+00	I	O	E
M-3	124+00	II	M	S
	95+00	II	M	S
L-3A	48+83	I	O	E
	0+00	I	O	E

1/ See Attached "Coding System for Inventory of Channel Work"

APPENDIX L

CHANNEL WORK BY REACHES

Channel	Station	Inventory of Channel Work 1/ Type of Work	Type Chan. Before Proj.	Flow Cond. Before Proj.
L-3B	62+00	I	O	E
	0+00	I	O	E
M-4	275+51	VI	M	S
	245+00	VI	M	S
	197+00	II	M	S
L-4A	124+00	II	M	S
	0+00	II	M	S
M-5	466+31	II	M	E
	257+00	II	M	E
	142+50	II	M	IS
L-5C	65+00	II	M	E
	44+00	II	M	E
	0+00	I	O	E
M-6	747+00	VI	M	PrS
	450+00	VI	M	PrS
L-6A	939+40	II	M	E
	915+00	II	M	E
	770+00	VI	M	E
	684+60	VI	M	S
	570+00	II	M	IS
	420+00	II	M	PrS
	375+00	VI	M	PrS
	280+00	II	M	PrS
L-6A1	310+53	II	M	E
	260+00	II	M	E
	119+00	IV	M	E
	117+00	II	M	E
	0+00	II	M	S
L-6A1B	150+00	II	M	E
	0+00	II	M	E
L-6A2	250+00	II	M	E
	0+00	II	M	E

1/ See Attached "Coding System for Inventory of Channel Work"

APPENDIX L

CHANNEL WORK BY REACHES

Channel	Station	Inventory 1/ of Channel Work: Type of Work	Type Chan. Before Proj.	Flow Cond. Before Proj.
L-6A2A	40+00	II	M	E
	0+00	II	M	E
L-6A2B	55+00	II	M	E
	0+00	II	M	E
L-6A3	410+00	IV	M	E
	360+00	IV	M	E
	80+00	II	M	E
	0+00	II	M	S
L-6A3A	55+00	II	M	E
	0+00	II	M	E
L-6A3D	6+53	IV	M	E
	0+00	IV	M	E
L-6A3E	5+36	II	M	E
	0+00	II	M	E
L-6A3F	3+24	II	M	E
	0+00	II	M	E
L-6A4	135+00	II	M	E
	50+00	II	M	E
	0+00	II	M	S
L-6A5	65+21	II	M	E
	93+00	II	M	E
	110+00	IV	M	E
	188+67	VI	M	E
	235+97	VI	M	S
L-6A5A	80+00	IV	M	E
	15+00	IV	M	E
	0+00	VI	M	E
L-6A6	107+58	IV	M	E
	40+00	IV	M	E
	0+00	VI	M	S

1/ See Attached "Coding System for Inventory of Channel Work"

APPENDIX L

CHANNEL WORK BY REACHES

Channel	Station	Inventory of Channel Work 1/ Type of Work	Type Chan. Before Proj.	Flow Cond. Before Proj.
L-6A6A	190+00	II	M	E
	0+00	II	M	E
L-6A6C	135+00	II	M	E
	0+00	II	M	E
L-6A6D	115+00	II	M	E
	0+00	II	M	E
L-6A7	173+00	VI	M	E
	43+70	VI	M	E
	0+00	IV	M	E
L-6A7A	90+00	II	M	E
	7+29	II	M	E
	0+00	VI	M	E
L-6A7B	35+00	II	M	E
	0+00	II	M	E
L-6A9	25+00	II	M	E
	0+00	II	M	E
L-6B	210+00	I	O	E
	124+25	I	O	E
	110+51	II	M	E
	71+00	II	M	S
	44+00	II	M	E
	0+50	II	M	S
L-6B1	30+00	II	M	E
	0+00	II	M	E
L-6C	342+00	II	M	E
	144+00	II	M	E
	113+00	II	M	S
	0+00	II	M	IS

1/ See Attached "Coding System for Inventory of Channel Work"

APPENDIX L

CHANNEL WORK BY REACHES

Channel	Station	Inventory of Channel Work 1/ Type of Work	Type Chan. Cond. Before Proj.	Flow Cond. Before Proj.
L-6C1	170+00	II	M	E
	0+00	II	M	E
L-6C2	50+00	II	M	E
	0+00	II	M	E
L-6D	264+40	II	M	E
	188+80	II	M	E
	0+00	II	M	S
L-7A	199+60	VI	M	S
	176+25	VI	M	S
L-7A1	273+00	II	M	S
	219+00	II	M	S
L-7A1B	40+00	II	M	S
	0+00	II	M	S
L-7A1C	45+00	II	M	S
	0+00	II	M	S
L-7A1D	45+00	II	M	E
	0+00	II	M	E
L-7A2	237+39	VI	M	S
	230+00	VI	M	S
	155+00	IV	M	S
	90+30	VI	M	S
L-7A2A	161+55	VI	M	S
	0+00	VI	M	S
L-7A2A2	30+85	II	M	S
	0+00	II	M	S
L-7A2B	148+00	II	M	E
	70+00	II	M	E
	0+00	II	M	S

1/ See Attached "Coding System for Inventory of Channel Work"

APPENDIX L

CHANNEL WORK BY REACHES

Channel	Station	Inventory 1/ of Channel Work: Type of Work	Type of Chan. Before Proj.	Flow Cond. Before Proj.
L-7A2C	50+00	II	M	S
	0+00	II	M	S
L-7A2D	30+00	II	M	S
	0+00	II	M	S
L-7A2E	30+00	II	M	S
	0+00	II	M	S
L-7A3	6+85	VI	M	S
	0+00	VI	M	S
L-7A3A	54+00	II	M	E
	36+70	II	M	E
	15+00	IV	M	S
	0+00	VI	M	S
L-7B South	0+00	IV	M	PrS
	17+00	IV	M	PrS
	100+00	II	M	PrS
L-7B North	160+00	II	M	S
	110+00	II	M	S
	60+00	IV	M	IS
	0+00	VI	M	IS
L-7B1	163+85	VI	M	S
	188+00	VI	M	S
	259+00	IV	M	S
L-7B1A	35+00	II	M	E
	0+00	II	M	E
L-7B1B	70+00	II	M	E
	0+00	II	M	E
L-7B2	143+76	VI	M	S
	164+20	VI	M	S

1/ See Attached "Coding System for Inventory of Channel Work"

APPENDIX L

CHANNEL WORK BY REACHES

Channel	Station	Inventory of Channel Work 1/ Type of Work	Type Chan. Before Proj.	Flow Cond. Before Proj.
L-7B2A	39+03	II	M	E
	0+00	II	M	E
L-7B3	23+40	VI	M	E
	0+00	VI	M	E
L-7B3A	70+00	II	M	E
	0+00	II	M	E
L-7B4	78+18	IV	M	E
	55+90	IV	M	E
	8+00	II	M	E
	0+00	IV	M	S
L-7B4A	18+82	IV	M	E
	9+00	IV	M	E
	0+00	VI	M	E
L-7C	170+00	II	M	IS
	100+00	II	M	IS
L-7C1	320+00	IV	M	E
	300+00	IV	M	E
	237+00	VI	M	E
	121+00	VI	M	S
	95+30	IV	M	S
	0+00	II	M	IS
L-7C1A	60+00	IV	M	E
	44+00	IV	M	E
	30+00	II	M	E
	0+00	II	M	S
L-7C1B	50+00	II	M	E
	0+00	II	M	E
L-7D	1093+00	II	M	E
	777+90	II	M	E
	734+30	VI	M	E
	475+80	II	M	IS
	433+50	IV	M	PrS
	80+00	VI	M	PrS

1/ See Attached "Coding System for Inventory of Channel Work"

APPENDIX L

CHANNEL WORK BY REACHES

Channel	Station	Inventory of Channel Work 1/ Type of Work	Type Chan. Before Proj.	Flow Cond. Before Proj.
L-7D1	305+50	II	M	S
	94+75	II	M	S
	0+00	IV	M	S
L-7D1A	60+00	II	M	E
	40+00	II	M	E
	0+00	II	M	S
L-7D1B	70+00	II	M	E
	40+00	II	M	E
	0+00	II	M	S
L-7D1C	234+00	II	M	E
	195+00	II	M	E
	150+00	VI	M	E
	0+00	VI	M	S
L-7D1C1	65+00	II	M	E
	0+00	II	M	E
L-7D1E	73+50	II	M	E
	55+00	II	M	E
	0+00	II	M	S
L-7D1G	57+00	II	M	E
	15+00	II	M	E
	0+00	II	M	S
L-7D1H	50+00	II	M	E
	0+00	II	M	E
L-7D3	41+00	VI	M	S
	0+00	VI	M	S
L-7D3A	195+22	II	M	E
	94+00	II	M	E
	44+00	VI	M	E
	0+00	VI	M	S

1/ See Attached "Coding System for Inventory of Channel Work"

APPENDIX L

CHANNEL WORK BY REACHES

Channel	Station	Inventory of Channel Work 1/ Type of Work	Type of Chan. Before Proj.	Flow Cond. Before Proj.
L-7D3A1	93+00	II	M	E
	0+00	II	M	E
L-7D4	67+00	II	M	E
	0+00	II	M	E
L-7D6	140+00	II	M	E
	0+00	II	M	E
L-7D7	101+25	IV	M	E
	0+00	IV	M	E
L-7D8	130+00	II	M	E
	0+00	II	M	E
L-7D10	102+00	II	M	E
	0+00	II	M	E
L-7D10A	62+00	II	M	E
	0+00	II	M	E
L-7D10A1	27+00	II	M	E
	0+00	II	M	E
L-7D13	73+00	II	M	E
	0+00	II	M	E
L-7D14	784+00	VI	M	E
	777+90	VI	M	E
L-7D14A	66+00	II	M	E
	0+00	II	M	E
M-8	106+54	VI	M	E
	150+00	VI	M	E
L-8A	72+38	II	M	E
	40+00	II	M	E
	0+50	VI	M	E

1/ See Attached "Coding System for Inventory of Channel Work"

APPENDIX L

CHANNEL WORK BY REACHES

Channel	Station	Inventory of Channel Work 1/		
		Type of Work	Type Chan. Before Proj.	Flow Cond. Before Proj.
L-8B	27+00	IV	M	E
	88+82	IV	M	E
	106+54	VI	M	E
M-9	12+00	VI	M	E
	0+00	VI	M	E
L-9A	20+00	II	M	E
	0+00	II	M	E

1/ See Attached "Coding System for Inventory of Channel Work"

Coding System for Inventory of Channel Work

Type of Work	I -	establishment of new channel including necessary stabilization measures
	II -	enlargement or realignment of existing channel or stream
	III -	cleaning out natural or manmade channel (includes bar removal and major clearing and snagging operation)
	IV -	clearing and removal of loose debris within channel section
	V -	stabilization, by continuous treatment or localized problem areas, as primary purpose (present capacity adequate)
	VI -	present capacity adequate, no work proposed
Type of Channel Before Project	M -	manmade ditch or previously modified channel
	N -	an unmodified, well-defined natural channel or stream
	O -	no or practically no defined channel
Flow Condition Before Channel	Pr -	perennial: flow at all times except during extreme drought
	I -	intermittent: continuous flow during some seasons of the year but little or no flow during other seasons
	E -	ephemeral: flow only during periods of surface runoff
	S -	ponded water: no noticeable flow, caused by lack of outlet, high ground water table or elevation of the channel bottom in relation to mean sea level

SUPPLEMENTAL WATERSHED WORK PLAN AGREEMENT

Between the

Lower Delta Soil and Water Conservation District
Local Organization

Ascension Parish Police Jury
Local Organization

Assumption Parish Police Jury
Local Organization

Iberville Parish Police Jury
Local Organization

Louisiana Department of Transportation and Development - Office of Public Works
Local Organization

(Referred to herein as sponsors)

State of Louisiana

and the

Soil Conservation Service
United States Department of Agriculture
(Referred to herein as SCS)

Whereas, the Watershed Work Plan Agreement for the LAKE VERRET WATERSHED, State of Louisiana, executed by the sponsoring local organizations named therein and the SCS, became effective on the 20th day of February, 1973, and

Whereas, in order to carry out the watershed work plan for said watershed, it has become necessary to modify said Watershed Work Plan to more clearly reflect the intent of the National Environmental Policy Act and the changed policies of the SCS and to supplement said Watershed Work Plan Agreement to reflect said modifications; and

Whereas, all of the local organizations listed above request that the Louisiana Department of Transportation and Development - Office of Public Works become one of the sponsors of said watershed, and;

Whereas, a Supplemental Watershed Work Plan narrative listing modifications has been developed through the cooperative efforts of the Sponsoring Local Organizations and the Service; which plan is annexed to and made a part of this agreement, and

Whereas, this Supplemental Watershed Work Plan Agreement supercedes all numbered items in the original Watershed Work Plan Agreement dated February 7, 1973;

Now, therefore, the Sponsoring Local Organization and the SCS hereby agree upon the following modifications of the terms, conditions, and stipulations of said watershed work plan agreement as supplemented.[1/]

1.* The Department of Transportation and Development - Office of Public Works has the responsibility, upon executing an agreement stipulating a mutually agreeable cost, to perform engineering services necessary to install structural measures shown in the watershed work plan as supplemented.

2*. The sponsors will acquire, with other than PL-566 funds, such land rights as will be needed in connection with the works of improvement. (Estimated cost $745,200).

3.* The sponsors assure that comparable replacement dwellings will be available for individuals and persons displaced from dwellings, will provide relocation assistance, advisory services and location assistance, make the relocation payments to displaced persons, and otherwise comply with the real property acquisition policies contained in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646, 84 Stat. 1894) effective as of January 2, 1971, and the regulations issued by the Secretary of Agriculture pursuant thereto. The cost of relocation payments will be shared by the sponsors and SCS as follows:

	Sponsors	SCS	Estimated Relocation Payment Costs
	(percent)	(percent)	(dollars)
Relocation Payments	69	31	-0-[1/]

[1/] Investigation has disclosed that under present conditions the project measures will not result in the displacement

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1/ Asterisk (*) indicates that the numbered item is changed from the original work plan agreement.

of any person, business, or farm operation. However, if relocations become necessary, relocation payments will be cost-shared in accordance with the percentages shown.

4. The Sponsors will acquire or provide assurance that landowners or water users have acquired such water rights pursuant to state law as may be needed in the installation and operation of the works of improvement.

5.* The percentages of construction costs to be paid by the sponsors and by the SCS are as follows:

Works of Improvement	Sponsors	SCS	Estimated Construction Costs
	(percent)	(percent)	(dollars)
Channel L-6A3, L-6A3D, L-6A3E, & L-6A3F	0	100	204,200
All Other Channel Work	25	75	2,269,400

The sponsors will provide a portion of the local share of the construction cost of structural measures by furnishing all equipment, labor, and materials to do construction on a portion of these measures. The amount and value of such work will be determined by mutual agreement immediately prior to the signing of the appropriate agreement and will be set forth in the project agreement.

6. The percentages of the cost for engineering services to be borne by the sponsors and the SCS as follows:

Works of Improvement	Sponsors	SCS	Estimated Engineering Costs
	(percent)	(percent)	(dollars)
Channel work	0	100	173,000

7. The sponsors and SCS will each bear the cost of Project Administration which it incurs, estimated to be $27,460 and $480,020, respectively.

8. The sponsors will provide assistance to landowners and operators to assure the installation of the land treatment measures shown in the watershed plan.

9. The sponsors will encourage landowners and operators to operate and maintain the land treatment measures for the protection and improvement of the watershed.

10. The sponsors will be responsible for the operation, maintenance and replacement of the works of improvement by actually performing the work or arranging for such work in accordance with agreements to be entered into prior to issuing invitations to bid for construction work.

11. The costs shown in this plan represent preliminary estimates. In finally determining the costs to be borne by the parties hereto, the actual costs incurred in the installation of works of improvement will be used.

12. This agreement is not a fund-obligating document. Financial and other assistance to be furnished by SCS in carrying out the plan is contingent upon the fulfillment of applicable laws and regulations and the availability of appropriations for this purpose.

13. A separate agreement will be entered into between SCS and sponsors before either party initiates work involving funds of the other party. Such agreements will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.

14.* This plan may be amended, revised, or terminated only by mutual agreement of the parties hereto except that the SCS may terminate financial and other assistance in whole or in part at any time it determines that the sponsors have failed to comply with the conditions of this agreement. In this case, the SCS shall promptly notify the sponsors in writing of the determination and the reasons for the termination, together with the effective date. Payments made to the sponsors or recoveries by the SCS under projects terminated shall be in accord with the legal rights and liabilities of the parties. An amendment to incorporate changes affecting a specific measure may be made by mutual agreement between the SCS and the sponsors having specific responsibilities for the measure involved.

15. No member of, or delegate to, Congress, or resident commissioner, shall be admitted to any share or part of this plan, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

16. The program conducted will be in compliance with all requirements respecting nondiscrimination as contained in the Civil Rights Act of 1964, as amended, and the regulations of the Secretary of Agriculture (7 CFR 15.1-15.12), which provide that no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any activity receiving Federal financial assistance.

The sponsors and the SCS further agree to all other terms, conditions, and stipulations of said Watershed Work Plan Agreement not modified herein.

ASSUMPTION PARISH
POLICE JURY
Local Organization

By Lawrence Gros
Lawrence Gros

Title President

Post Office Box 186
Labadieville, Louisiana 70372
Address Zip Code

Date 5/10/78

The signing of this agreement was authorized by a resolution of the governing body of the Assumption Parish Police Jury
Local Organization
adopted at a meeting held on May 10, 1978

Roger Bourg
Roger Bourg
Secretary, Local Organization

Post Office Box 518
Napoleonville, Louisiana 70390
Address Zip Code

Date 5/10/78

IBERVILLE PARISH POLICE JURY
Local Organization

By Salvador J. Cardinal
Salvador J. Cardinal
Title President

Post Office Box 389
Plaquemine, Louisiana 70767
Address Zip Code

Date 5/2/78

The signing of this agreement was authorized by a resolution of the governing body of the Iberville Parish Police Jury
Local Organization
adopted at a meeting held on May 2, 1978

Carl J. Grant
Carl Grant
Secretary, Local Organization

Post Office Box 389
Plaquemine, Louisiana 70767
Address Zip Code

Date 5/2/78

LOWER DELTA SOIL AND WATER CONSERVATION DISTRICT
Local Organization

By Andrew P. Gay
Andrew P. Gay

Title Chairman

Post Office Box 72
Donaldsonville, Louisiana 70346
Address Zip Code

Date 5/17/78

The signing of this agreement was authorized by a resolution of the governing body of the Lower Delta Soil and Water Conservation District
Local Organization
adopted at a meeting held on May 17, 1978

Hayward Simoneaux
Hayward Simoneaux
Secretary, Local Organization

Post Office Box 72
Donaldsonville, Louisiana 70346
Address Zip Code

Date 5/17/78

ASCENSION PARISH POLICE JURY
Local Organization

By Vincent J. Tortorich
Vincent J. Tortorich
Title President

Post Office Box 351
Donaldsonville, Louisiana 70346
Address Zip Code

Date 5/4/78

The signing of this agreement was authorized by a resolution of the governing body of the Ascension Parish Police Jury
Local Organization
adopted at a meeting held on May 4, 1978

John C. Spano
John C. Spano
Secretary, Local Organization

Post Office Box 351
Donaldsonville, Louisiana 70346
Address Zip Code

Date 5/4/78

DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT OFFICE OF PUBLIC WORKS Local Organization	BY George A. Fischer George A. Fischer Title Secretary, DOTD Date 6-28-78
Post Office Box 44155, Capitol Station Baton Rouge, Louisiana 70804	BY Roy Aguillard Roy Aguillard Title Assistant Secretary, Office of Public Works Date 6-21-78

Appropriate and careful consideration has been given to the environmental impact statement prepared for this project and to the environmental aspects thereof.

Soil Conservation Service
United States Department of Agriculture

Approved by:

Alton Mangum
State Conservationist

7/17/78
Date

NARRATIVE TO SUPPLEMENTAL
WATERSHED WORK PLAN AGREEMENT

April 1978

Foreword

The Lake Verret Watershed Work Plan was approved for operations on February 20, 1973. As required by Section 102(2)(C) of the National Environmental Policy Act of 1969 (Public Law 91-190), an environmental impact statement was submitted to the Council on Environmental Quality. Because of the concern for environmental values by the Service, other Federal, State, and local agencies, and other interests in the project, the Sponsoring Local Organizations requested the plan be supplemented to eliminate and minimize damages to important environmental factors and to prepare a revised environmental impact statement in accordance with revised guidelines before commencing installation of structural measures.

The Service, the Sponsors, the U.S. Fish and Wildlife Service, the Louisiana Department of Wildlife and Fisheries, the U.S. Forest Service, and the Louisiana Office of Public Works and other interested publics have reviewed the watershed work plan to determine changes needed to provide a plan more compatible with the present land use and one that would minimize adverse effects on the environment. Flood protection for the western urban area of Donaldsonville, Louisiana was included as a project objective as requested by the sponsors. The Sponsors also requested that one new channel located in open land be included as a project channel. Since this watershed was planned, the policy of the Service has changed, particularly in relation to wetlands. Previously, Types 3, 4, and 5 were the wetlands that could not be converted to another land use as a purpose of a P.L. 566 project. New policy provides that the Service is not to provide technical and financial assistance for draining or otherwise altering wetlands Types 3 through 20 in order to convert them to other land uses. As the result of a statewide study conducted by the Service, and new studies for preparation of this supplement, the lowest elevations at which lands can be adequately drained by gravity for crop production in the Lake Verret Watershed has been revised; this resulted in the raising of design water surface elevations on the downstream end of most channels that outlet through forest land. As a result of these changes about 52 miles of previously planned project channels in Types 1 and 7 Wetlands have been eliminated. Work on an additional 20 miles of channel segments in Type 1 and 7 Wetlands were eliminated also, but the present flow conditions will need to be maintained. Adequate drainage and flood protection for existing cropland and pastureland will be provided in keeping with project objectives. The Sponsors and the Service have agreed the following revisions will be made to provide a plan that achieves the project objectives and reduces adverse effects on the environment.

Since numerous changes were required, the Sponsors and the SCS believe that the best way to avoid misunderstanding is to completely rewrite the Watershed Work Plan Agreement. Therefore, the Supplemental Watershed Work Plan Agreement cancels and supersedes the original agreement. All pertinent information contained in the original agreement is incorporated in this document.

Changes in major features of the Watershed Work Plan are as follows:

1. The Lower Delta Soil and Water Conservation District and the police juries of Ascension, Assumption, and Iberville Parishes requested that the Department of Transportation and Development - Office of Public Works (DOTD - OPW) become one of the sponsors of the Lake Verret Watershed. DOTD - OPW will perform, under agreement with the Soil Conservation Service, the engineering services necessary to install the structural measures.

2. The "c" value concerning runoff in the Cypress Creek formula used to design channels that drain open agricultural land remains at 50 smaller coefficients, which reflect slower rates of runoff were determined for forest land. The "c" value of 23 was used to compute runoff from forest land located upstream of the benefited area. The "c" value of 10 was used to compute runoff from forest land located downstream from the benefited area.

   Channels L-6A3, L-6A3D, L-6A3E, and L-6A3F were designed for the specific purpose of eliminating or minimizing damages from flood peaks in affected residential areas with an average recurrence interval of 100 years. Project channels that affect flooding in urban, residential, and industrial areas, but did not have the specified purpose of flood protection in such areas, were designed to eliminate or minimize damages from flood peaks in these areas with an average recurrence interval of two years.

3. Channels L-5A, L-5B, L-6A3B, L-6A3C, L-6D1, L-6D2, M-7, L-7A1A, L-7A2F, L-7A2F1, L-7B5, L-7D1D, L-7D1F, L-7D2, L-7D3A2, L-7D5, L-7D5A, L-7D7A, L-7D11, L-7D12, L-7E, and M-15 were eliminated.

4. Construction and appurtenant structures on Channels M-6, L-7A, L-7A3, and M-8 were eliminated. Maintenance of present flow conditions will be required for the entire length of L-7A3, M-8, and for a portion of M-6 and L-7A.

5. Portions of project Channels M-1, L-1B2, M-2, M-3, M-4, M-5, M-6, L-6A, L-6A5A, L-6A7, L-6A7A, L-7A, L-7A1, L-7A2, L-7A2A, L-7A2A2, L-7A3, L-7A3A, L-7B South, L-7B North, L-7B1, L-7B2, L-7B3, L-7B4, L-7C, L-7C1A, L-7D, L-7D1, L-7D1C, L-7D3, L-7D7, L-7D14, M-8, L-8A, L-8B, and M-9 were eliminated.

6. Channels L-6A1, L-6A3, L-6A5, and L-7D3A were extended a total of 3 miles.

7. A portion of Channel L-2A was eliminated. Another portion was designed to flow to an outlet other than M-2 which is Channel M-20. The remaining upper portion was named L-20A, and the name of Channel L-2A2 was changed to L-20A1.

8. Estimated channels were numbered and placed on the Project Map.

9. Channels L-6A3E, L-5A, and L-6A3F were added.

10. A structure for water control will be installed in the ditch opening on the east side of Channel L-7D-1 to maintain the Type 7 Wetlands.

11. The term "clear and shape" was changed to "clear only" when used to describe applicable channel work.

12. All disturbed areas, except spread spoil in cropland, will be vegetated with a perennial grass species designed to establish permanent vegetation. Spoil that will not be spread will be vegetated with perennial species immediately after it has been placed and shaped. When it is determined that spoil will be stacked and then later spread, the stacked spoil will be vegetated with an annual species for temporary protection. After the spoil is pread, perennial vegetation will be established on the spread spoil in all areas other than cropland.

13. Efforts will be made to maintain trees along channels for aesthetic and wildlife purposes giving consideration to requirements for construction and operation and maintenance. Spoil will be placed in a manner that will not kill the trees. Spoil will be spread in open areas unless otherwise requested by landowner.

14. Wastes and construction debris will be buried, burned, or removed from the construction sites.

15. Noise levels will be monitored by the SCS and standards set by the Occupational Safety and Health Act will be followed.

16. An archaeological survey was conducted by personnel of Louisiana State University. No sites were located that would be affected by project installation.

17. Project channels located in forest land and those having wooded channel banks will be dug primarily from one side. In some instances such as at bridge crossings, utility lines, pipelines, and along property lines the channel may have to be dug from both sides. In selecting which side to dig from, consideration will be given to providing the most effective shade for the channels containing ponded water.

18. A 30-acre wetland area will be developed to mitigate the loss of 29 acres of Type 7 Wetlands due to construction and/or maintenance of project channels. The Assumption Parish Police Jury will assume the responsibility for constructing this wetland area. This will constitute a portion of their share of the construction cost for channel work.

19. The original land treatment program provided for 91,900 acres to receive adequate treatment over a ten-year period. Because of shifts in land use, this acreage was revised to 84,800 acres and the installation period extended for an additional four years. Since 1973, when the watershed was approved for operations, 29,600 acres have received adequate treatment, leaving 55,200 acres to be treated during the remainder of the installation period. The land treatment program for the entire installation period is shown on table 1.

20. Present and projected land uses are changed as shown on the following tabulation.

Land Use	Present	Future Without Project	Future With Project
Cropland	90,200	84,500	85,165
Pastureland	9,100	8,400	8,351
Forest Land	125,500	123,000	121,567
Other	21,200	30,100	30,917
Total	246,000	246,000	246,000

21. It is planned that construction will proceed in the order of revised priorities designated by the Sponsors. Priority Area No. 1 is the tributaries of Channel M-6, that are project channels (the M-6 system), and the 30-acre wetland development. Priority Area No. 2 is Channels M-1, M-2, M-3, M-4, M-5, M-20, L-7A, L-7B, and their tributaries that are project channels. Priority Area No. 3 is Channels M-8, M-9, L-7C, L-7D, and their tributaries that are project channels.

22. The table on page 20 of the Watershed Work Plan entitled "Division of Responsibility" is modified as follows:

Channel Number	Division of Responsibility (Parishes)		
	Assumption (percent)	Ascension (percent)	Iberville (percent)
L-6A	0	50	50
L-6C	52	37	11
L-6D	0	53	47
L-6A3	0	92	8
L-6A4	0	91	9
L-6A6	0	7	93

Operation and Maintenance

Channel maintenance includes periodic cleanouts necessary to restore channels to their planned capacities, repair of bank erosion, maintenance of vegetative cover, control of undesirable vegetation, and repair or replacement of appurtenant structures. Maintenance of structures for water control includes repairing rills around headwalls or wingwalls, maintaining or replacing vegetation on fills, repairing worn or broken parts, replacing shortlife parts, and all other activities essential to the functioning and safety of the structure. The aesthetics of the channels and structure sites shall be an important consideration of the maintenance program.

Existing public roads, farm roads, turnrows, trails, open areas, and other existing facilities will be used for maintenance equipment to reach the channels. Sufficient access will be available to properly maintain all channels. The channels will be kept clear of excessive vegetation by use of approved herbicides and by mowing and hand labor. Spraying will be accomplished in the late spring and summer months when the ephemeral channels and the intermittent channels are most likely to have the least flow. Spraying during these months will lower the probability of runoff carrying undegraded herbicides into other areas. Eroded banks, side inlets, and other appurtenances will be repaired as needed. Localized sediment accumulations in channels will be removed periodically by mechanical means. Use of these techniques should result in a channel maintenance program that is environmentally acceptable.

Vegetation remaining on channel banks not disturbed during construction will be maintained. Trees left in channel rights-of-way for landscape purposes will not be destroyed by maintenance. Two complete mechanical cleanouts are anticipated during the life of the project.

Operation and maintenance of the 30-acre wetland development includes the following: (1) repair or replacement of the water supply unit and structures for water control; (2) repair of bank erosion, maintenance of vegetative cover and control of undesirable vegetation on levees and water supply channel; and (3) operating the area according to the agreed-to management plan.

The estimated annual maintenance cost of structural measures is about $168,300, based on 1976 prices. This estimated cost by parishes is: Ascension $19,800, Assumption $32,000, and Iberville $115,900.

Installation Cost

The total estimated cost of installing structural measures on the 168 miles of channels is $3,899,280; of which $2,559,270 will be borne by Public Law 566, and $1,340,010 will be borne by Sponsoring Local Organizations. Of the amount borne by Public Law 566, $1,906,250 is for construction, $173,000 for engineering services, and $480,020 for project administration. Of the amount borne by Sponsoring Local Organizations, $567,350 is for construction, $745,200 is for land rights, and $27,460 is for project administration. Engineering services consist of surveys, investigations, designs, and preparation of plans and specifications. Project administration includes administration of contracts and construction inspection.

The cost of installing the land treatment program is estimated to be $8,148,400. Since the watershed was approved for operations, $1,451,100 has been used to install parts of the program. Of the $6,697,300 remaining, $1,400,600 is for technical assistance, of which $964,600 will be borne by Public Law 566 funds and $436,000 will be borne by other funds. The remaining $5,296,700 will be the landusers cost for installing the individual land treatment measures.

Project Benefits

The agricultural benefits were updated to reflect current prices. Prices received for agricultural commodities have changed since the initial economic evaluation in 1969. The cost of production has changed, also.

The agricultural benefits were originally developed on the entire acreage of open land. The current economic evaluation includes the effect of channel modifications, and land use distribution by evaluation units. These changes resulted in fewer agricultural acres benefited as displayed on the revised Project Map. Average annual agricultural benefits are displayed on revised tables 5 and 6.

All agricultural benefits are allocated equally to flood prevention and drainage. The multiple-purpose allocation of agricultural benefits, as well as costs, remain as in the original plan. The costs for channels to provide agricultural protection have been updated to reflect 1976 prices.

Urban benefits within the western portion of Donaldsonville, Louisiana, are all flood prevention. The costs of Channels L-6A3, L-6A3D, L-6A3E, and L-6A3F are considered single-purpose flood prevention and are 1976 prices. Channel L-6A3A is the only lateral in the L-6A3 system that is multiple-purpose and benefits agricultural land, not urban.

Channel L-6A3 is an adequate outlet for agricultural purposes upstream. The additional request by the sponsor to include urban flood protection will require excavation to provide the 100-year level of protection. Thus, the entire cost of L-6A3 system, except L-6A3A, is allocated to flood prevention. Channel L-6A3A will be excavated to reduce flooding and improve drainage of agricultural land; therefore the entire cost of L-6A3A is allocated to multi-purpose flood prevention and drainage. Urban benefits are displayed on revised table 5.

Urban benefits were developed for the western portion of Donaldsonville below the 100-year flood stage WITHOUT the project. The WITH and WITHOUT 100-year flood limits are shown on the Figure 5, Urban Flood Plain Map. Proposed channel work for flood prevention will prevent significant damages to residences. There will be no above-floor flooding of homes with the project. Reduction in frequency of flooding will eliminate essentially the chance of loss of human life from overbank flooding. In order to prevent the local citizenry from assuming a false sense of security from the planned measures, the Sponsors will publicize at least annually the nature and extent of flood hazards remaining in those areas subject to flooding by the 100-year storm.

Direct primary benefits are estimated to be $1,437,100 annually. Of this amount, $641,100 is from damage reduction to agricultural crops and pasture and $129,400 is from more intensive use of agricultural land. The reduction in average annual urban damages is estimated to be $44,000, or 98 percent. Drainage benefits expected to accrue amount to $582,800 annually and include increased efficiency of production inputs and improved quality. The average annual redevelopment benefits expected to accrue in all three parishes in the watershed amount to $39,800.

Secondary benefits stemming from the project in the form of increased net returns and those induced by the project in the form of increased production expenditures will contribute to the economy of the area. Local benefits accruing annually from these sources and urban improvement are expected to be $157,200. Secondary benefits from a national viewpoint also can accrue to this project, but were not considered pertinent to the economic evaluation.

Comparison of Benefits and Costs

Average annual primary benefits (including redevelopment benefits) from structural measures are estimated to be $1,437,100. The average annual cost of structural measures (amortized installation cost plus operation and maintenance) is estimated to be $395,600, providing a benefit-cost ratio of 3.6 to 1. Total average annual benefits (including secondary benefits) from structural measures are estimated to be $1,594,300, providing a benefit-cost ratio of 4.0 to 1.

The tables, Schedule of Obligations, and project map have been revised. These revisions are included in this Supplemental Watershed Work Plan Agreement.

SCHEDULE OF OBLIGATIONS
(Dollars) 1/

Year	Measures	PL-566 Funds	Other Funds	Total Funds
1st *	Land Treatment	-	68,900	68,900
	Technical Assistance	7,900	6,600	14,500
2nd *	Land Treatment	-	331,600	331,600
	Soil Surveys	30,600	-	30,600
	Technical Assistance	37,100	37,400	74,500
3rd *	Land Treatment	-	427,800	427,800
	Soil Surveys	24,200	900	25,100
	Technical Assistance	35,300	39,500	74,800
4th *	Land Treatment	-	297,000	297,000
	Soil Surveys	32,100	-	32,100
	Technical Assistance	31,000	43,200	74,200
5th	Engineering Services	81,400	-	81,400
	Land Rights	-	416,700	416,700
	Project Administration	72,000	5,490	77,490
	Land Treatment	-	355,000	355,000
	Technical Assistance	52,900	43,600	96,500
6th	Construction	922,175	239,325	1,161,500
	Engineering Services	53,000	-	53,000
	Land Rights	-	163,700	163,700
	Project Administration	96,000	5,490	101,490
	Land Treatment	-	401,700	401,700
	Technical Assistance	66,300	43,600	109,900
7th	Construction	570,525	190,175	760,700
	Engineering Services	38,600	-	38,600
	Land Rights	-	164,800	164,800
	Project Administration	144,000	5,490	149,490
	Land Treatment	-	458,200	458,200
	Technical Assistance	80,900	43,600	124,500
8th	Construction	413,550	137,850	551,400
	Project Administration	110,400	5,490	115,890
	Land Treatment	-	513,400	513,400
	Technical Assistance	93,900	43,600	137,500
9th	Project Administration	57,620	5,500	63,120
	Land Treatment	-	560,700	560,700
	Technical Assistance	105,300	43,600	148,900
10th	Land Treatment	-	605,700	605,700
	Technical Assistance	113,400	43,600	157,000
11th	Land Treatment	-	605,100	605,100
	Technical Assistance	113,400	43,600	157,000
12th	Land Treatment	-	600,700	600,700
	Technical Assistance	156,400		
13th	Land Treatment	-	600,900	600,900
	Technical Assistance	112,800	32,600	156,400
14th	Land Treatment	-	595,300	595,300
	Technical Assistance	112,900	43,600	156,500
	Total	3,722,070	8,325,610	12,047,680

1/ Price Base 1976
* Actual expenditures during the first four years.

TABLE 1 - ESTIMATED PROJECT INSTALLATION COST

Lake Verret Watershed, Louisiana

Installation Cost Item	Unit	Number Non-Federal Land	Estimated Cost (Dollars)1/ P.L. 566 Funds SCS 4/	P.L. 566 Funds FS 4/	P.L. 566 Funds Total	Other SCS 4/	Other FS	Other Total	Total
LAND TREATMENT									
Land Areas 2/									
Cropland	Acres	60,900	-	-	-	5,996,300	-	5,996,300	5,996,300
Pastureland	to be	3,200	-	-	-	42,400	-	42,400	42,400
Forest 3/	Treated	20,700	-	-	-	379,300	-	379,300	379,300
Individual Practices									
Fire Control	-	-	-	-	-	-	1,500	1,500	1,500
Technical Assistance	-	-	1,162,800	-	1,162,800	563,600	2,500	566,100	1,728,900
TOTAL LAND TREATMENT			1,162,800		1,162,800	6,981,600	4,000	6,985,600	8,148,400
STRUCTURAL MEASURES									
Construction									
Channel Work 5/									
(M)	Miles	153	1,640,175	-	1,640,175	546,725	-	546,725	2,186,900
(O)	Miles	6	93,375	-	93,375	31,125	-	31,125	124,500
Urban (M)	Miles	9	204,200	-	204,200	-	-	-	204,200
Subtotal-Construction			1,937,750		1,937,750	577,850	-	577,850	2,515,600
Engineering Services			175,900	-	175,900	-	-	-	175,900
Relocation Payments			-	-	-	-	-	-	-
Project Administration									
Construction Inspection			252,200	-	252,200	-	-	-	252,200
Other			236,640	-	236,640	28,720	-	28,720	265,360
Relocation Assistance									
Advisory Services			-	-	-	-	-	-	-
Subtotal-Administration			488,840	-	488,840	28,720	-	28,720	517,560
Other Costs									
Land Rights			-	-	-	748,600	-	748,600	748,600
Subtotal-Other			-	-	-	748,600	-	748,600	748,600
TOTAL STRUCTURAL MEASURES			2,602,490	-	2,602,490	1,355,170	-	1,355,170	3,957,660
TOTAL PROJECT			3,765,290		3,765,290	8,336,770	4,000	8,340,770	12,106,060

1/ Price base 1976
2/ Includes only areas estimated to be adequately treated during the project installation period. Treatment will be accelerated throughout the watershed and dollar amounts apply to total land area; not just adequately treated areas.
3/ To be treated for wildlife habitat only.
4/ Federal agency responsible for assisting in installation of works of improvement.
5/ Type of channel before project; (M)-manmade ditch or previously modified channel; and (O)-none or practically no defined channel.

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TABLE 2 - ESTIMATED STRUCTURAL COST DISTRIBUTION

Lake Verret Watershed, Louisiana

(Dollars)1/

Item	Installation Cost - P.L. 566 Funds: Construction	Installation Cost - P.L. 566 Funds: Engineering	Installation Cost - P.L. 566 Funds: Total Public Law 566	Installation Cost - Other Funds: Construction	Installation Cost - Other Funds: Land Rights	Installation Cost - Other Funds: Total Other	Total Installation Cost4/
CHANNEL WORK 2/							
Evaluation Unit I							
(M)	51,600	4,700	56,300	17,200	7,000	24,200	80,500
Subtotal-Unit I	51,600	4,700	56,300	17,200	7,000	24,200	80,500
Evaluation Unit II							
(M)	44,325	4,200	48,525	14,775	5,300	20,075	68,600
(O)	64,575	6,000	70,575	21,525	5,100	26,625	97,200
Subtotal-Unit II	108,900	10,200	119,100	36,300	10,400	46,700	165,800
Evaluation Unit III							
(M)	9,525	800	10,325	3,175	600	3,775	14,100
(O)	19,500	1,800	21,300	6,500	1,800	8,300	29,600
Subtotal-Unit III	29,025	2,600	31,625	9,675	2,400	12,075	43,700
Evaluation Unit IV							
(M)	30,225	2,800	33,025	10,075	9,900	19,975	53,000
Subtotal-Unit IV	30,225	2,800	33,025	10,075	9,900	19,975	53,000
Evaluation Unit V							
(M)	98,625	9,200	107,825	32,875	57,100	89,975	197,800
Subtotal-Unit V	98,625	9,200	107,825	32,875	57,100	89,975	[illegible],800
Evaluation Unit VI							
(M)	258,450	24,100	282,550	86,150	126,100	212,250	494,800
(O)	9,300	800	10,100	3,100	5,700	8,800	18,900
Subtotal-Unit VI	267,750	24,900	292,650	89,250	131,800	221,050	513,700
Evaluation Unit VII							
(M)	394,275	36,800	431,075	131,425	149,300	280,725	711,800
Subtotal-Unit VII	394,275	36,800	431,075	131,425	149,300	280,725	711,800
Evaluation Unit VIII							
(M)	98,775	9,200	107,975	32,925	43,700	76,625	184,600
Subtotal-Unit VIII	98,775	9,200	107,975	32,925	43,700	76,625	184,600
Evaluation Unit IX							
(M)	153,375	14,300	167,675	51,125	33,200	84,325	252,000
Subtotal-Unit IX	153,375	14,300	167,675	51,125	33,200	84,325	252,000
Evaluation Unit X							
(M)	481,725	45,100	526,825	160,575	131,000	291,575	818,400
Urban (M)	204,200	14,300	218,500	-	157,300	157,300	375,800
Subtotal-Unit X	685,925	59,400	745,325	160,575	288,300	448,875	1,194,200
Evaluation Unit XI							
(M)	19,275	1,800	21,075	6,425	15,500	21,925	43,000
Subtotal-Unit XI	19,275	1,800	21,075	6,425	15,500	21,925	43,000
Project Administration	xxxxx	xxxxx	488,840	xxxxx	xxxxx	28,720	517,560
GRAND TOTAL	1,937,750	175,900	2,602,490	577,650	748,6003/	1,355,170	3,957,660

1/ Price base 1976.
2/ Type of channel before the project; (M)-manmade ditch or previously modified channel; and (O)-none or practically no defined channel.
3/ Includes $243,200 for value of land, legal fees, and surveys; $280,900 for replacement or modification of bridges and culverts; and $211,900 for modification of pipelines, utility lines, and miscellaneous facilities.
4/ The cost of this work includes channel work (excavation and clearing), appurtenant grade stabilization structures, structures for water control, and vegetative plantings.

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TABLE 2A - COST ALLOCATION AND COST SHARING SUMMARY

Lake Verret Watershed, Louisiana
(Dollars)1/

Item	Cost Allocation			Cost Sharing					
	Purpose			Public Law 566			Other		
	Flood Prevention	Drainage	Total	Flood Prevention	Drainage	Total	Flood Prevention	Drainage	Total
MULTIPLE PURPOSE									
Channel Work With Appurtenant Structures	1,532,150	1,532,150	3,064,300	1,236,500	658,650	1,895,150	295,650	873,500	1,169,150
SINGLE PURPOSE									
Channel Work With Appurtenant Structures	375,800	-	375,800	218,500	-	218,500	157,300	-	157,300
TOTAL	1,907,950	1,532,150	3,440,100	1,455,000	658,650	2,113,650	452,950	873,500	1,326,450

1/ Price base 1976.

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TABLE 3 - STRUCTURE DATA
CHANNELS

Lake Verret Watershed

Channel	Station	Drainage Area (sq mi)	Capacity Req'd (cfs)	Capacity Des. (cfs)	Water Surf. Elev.	Hydr. Grad. (ft/ft)	Channel Dimensions: Bottom Width (ft)	Bottom Grade (%)	Flow Depth (ft)	Side Slope	"n" Value Aged	"n" Value As Built	Velocities Aged (fps)	Velocities As Built (fps)	Excavation (cu yd)	Inventory of Chan. Work 1/: Type of Work	Type Chan. Before Proj.	Flow Cond. Before Proj.
M-1	0+74	5.47	206	631	3.8	0.00024	A= 273.00		P= 52.00		0.030	0.030	2.31	2.31		VI	M	S
	10+00	7.03	254	754	3.1	0.00024	A= 309.00		P= 54.00		0.030	0.030	2.45	2.45		VI	M	S
M-1 East	0+00	1.13	55	87	3.0	0.00001	A= 234.00		P= 51.70		0.035	0.035	0.37	0.37		VI	M	S
	11+74	1.36	65	87	3.0	0.00001	A= 234.00		P= 51.70		0.035	0.035	0.37	0.37		VI	M	S
L-1A	42+82	0.10	7	15	3.3	0.00006	8.0	0.06	3.0	1.5:1	0.045	0.025	0.40	0.72		II	M	S
	0+00	1.06	52	54	3.0	0.00006	8.0	0.06	5.4	1.5:1	0.040	0.025	0.62	0.99	3200	II	M	S
L-1B	[illegible]	0.19	13	16	6.1	0.00010	6.0	0.04	3.0	1.5:1	0.045	0.025	0.50	0.90		II	M	E
	73+87	1.26	61	61	5.0	0.00010	6.0	0.04	5.5	1.5:1	0.040	0.025	0.78	1.25		II	M	F
	0+00	3.08	128	130	3.8	0.00015	10.0	0.02	6.2	1.5:1	0.040	0.025	1.09	1.74	23000	II	M	S
L-1B-1	67+28	0.13	9	11	3.8	0.00005	6.0	0.04	3.0	1.5:1	0.040	0.025	0.48	0.77		I	O	E
	0+00	1.27	61	62	3.5	0.00005	10.0	0.04	5.6	1.5:1	0.040	0.025	0.60	0.96	7200	I	O	E
L-1B-2	34+09	0.33	20	32	6.8	0.00041	6.0	0.06	3.0	1.5:1	0.045	0.025	1.01	1.82		II	M	E
	0+00	0.84	43	43	5.0	0.00041	6.0	0.06	3.5	1.5:1	0.045	0.025	1.10	1.98	1100	II	M	E
M-2	260+10	2.75	116	118	3.5	0.00003	24.0	0.003	6.2	1.5:1	0.035	0.023	0.57	0.89		II	M	S
	220+00	3.36	137	118	3.4	0.00003	24.0	0.003	6.2	1.5:1	0.035	0.023	0.57	0.89	19400	II	M	S
		overbank		119	3.4	0.00003	A=2500.00		P=3500.00		0.125	0.125	0.05	0.05	0			
	122+47	5.37	203	64	3.1	0.00003	A= 154.00		P= 46.00		0.040	0.040	0.42	0.42		VI	M	S
				159 cfs diverted by overbank flow to south														
	100+00	6.32	232	73	3.1	0.00003	A= 193.00		P= 59.00		0.040	0.040	0.41	0.41		VI	M	S
				159 cfs diverted by overbank flow														
M-20	214+00	1.43	67	76	3.3	0.00003	10.0	0.02	6.9	1.5:1	0.035	0.023	0.54	0.84		I	O	E
	150+00	2.24	98	100	3.2	0.00003	10.0	0.02	7.9	1.5:1	0.035	0.023	0.58	0.90		I	O	E
	115+00	4.15	164	178	3.1	0.00003	16.0	0.02	8.4	1.5:1	0.030	0.023	0.74	1.00	75000	II	M	S
L-20A	68+00	0.83	43	43	3.3	0.00003	10.0	0.03	5.6	1.5:1	0.040	0.025	0.42	0.67		II	M	S
	0+00	1.69	77	87	3.2	0.00003	10.0	0.03	7.4	1.5:1	0.035	0.023	0.56	0.87	17900	II	M	S
L-20A-1	21+64	0.60	33	37	3.5	0.00010	4.0	0.01	4.8	1.5:1	0.040	0.025	0.69	1.10		I	O	E
	0+00	0.69	37	38	3.3	0.00010	4.0	0.01	4.8	1.5:1	0.040	0.025	0.69	1.10	4700	I	O	E
M-3	124+00	0.80	42	42	3.0	0.00002	12.0	0.02	5.8	1.5:1	0.040	0.025	0.35	0.56		II	M	S
	95+00	0.99	50	50	3.0	0.00002	12.0	0.02	6.3	1.5:1	0.040	0.025	0.37	0.59	10800	II	M	S
L-3A	48+83	0.01	1	11	3.2	0.00005	6.0	0.02	3.0	1.5:1	0.045	0.025	0.35	0.63		I	O	E
	0+00	0.29	18	19	3.0	0.00005	6.0	0.02	3.9	1.5:1	0.045	0.025	0.41	0.74	5000	I	O	E
L-3B	62+00	0.01	1	11	3.3	0.00005	6.0	0.03	3.0	1.5:1	0.045	0.025	0.35	0.63		I	O	E
	0+00	0.50	28	28	3.0	0.00005	6.0	0.03	4.5	1.5:1	0.040	0.025	0.49	0.78	9200	I	O	E
M-4	275+51	3.20	132	192	5.1	0.00030	A= 146.00		P= 36.00		0.050	0.050	1.31	1.31		VI	M	S
	245+00	3.20	132	202	4.1	0.00030	A= 155.00		P= 38.00		0.050	0.050	1.30	1.30		VI	M	S
	197+00	7.74	275	276	3.9	0.00005	14.0	0.05	9.2	1.5:1	0.030	0.023	1.08	1.44	6000	II	M	S
L-4A	124+00																	
	0+00	1.69	Estimated												14700	II	M	S
M-5	466+31	0.16	11	26	12.4	0.00045	4.0	0.06	3.0	1.5:1	0.045	0.025	1.01	1.82		II	M	E
	420+17	0.76	40	40	10.3	0.00045	4.0	0.06	3.7	1.5:1	0.045	0.025	1.13	2.03		II	M	E
	347+16	3.49	142	151	9.6	0.00010	10.0	0.04	6.9	1.5:1	0.035	0.023	1.08	1.68		II	M	E
	257+00	4.44	173	244	4.2	0.00060	6.0	0.06	6.9	1.5:1	0.040	0.025	2.16	3.46		II	M	E
	142+50	7.22	260	264	3.6	0.00005	20.0	0.01	7.9	1.5:1	0.030	0.023	1.05	1.40	105000	II	M	IS
L-5C	65+00															II	M	E
	44+00															II	M	E
	0+00	.75	Estimated												3400	I	O	E
M-6	747+00	48.63	0 2/	386	4.7	0.00002	A= 469.00		P= 75.00		0.030	0.030	0.82	0.82		VI	M	PrS
	450+00	74.30	525	628	4.0	0.00002	A= 760.00		P= 121.00		0.030	0.030	0.83	0.83		VI	M	PrS
L-6A	939+40	0.59	33	39	18.4	0.00060	6.0	0.06	3.0	1.5:1	0.045	0.025	1.23	2.21		II	M	E
	915+00	0.73	39	39	17.0	0.00060	6.0	0.06	3.0	1.5:1	0.045	0.025	1.23	2.21		II	M	E
	835+46	1.58	73	166	12.2	0.00060	A= 135.40		P= 47.10		0.060	0.060	1.23	1.23		VI	M	E
	770+00	3.28	135	313	8.6	0.00055	A= 166.30		P= 43.90		0.045	0.045	1.88	1.88		VI	M	E
	757+62	3.32	136	313	7.9	0.00055	A= 166.30		P= 43.90		0.045	0.045	1.88	1.88		VI	M	S
	684+60	15.46	490	882	5.9	0.00027	A= 328.60		P= 54.80		0.030	0.030	2.68	2.68		VI	M	S
	570+00	28.84	823	833	5.5	0.00004	26.0	0.02	12.5	1.5:1	0.025	0.023	1.56	1.73		II	M	IS
	420+00	44.78	1188	1180	4.9	0.00004	40.0	0.01	12.6	1.5:1	0.025	0.023	1.59	1.77		II	M	PrS
	375+00	48.63	1273	1608	4.7	0.00004	A= 957.20		P= 101.40		0.025	0.025	1.68	1.68		VI	M	PrS
	280+00	48.63	1273	1287	4.5	0.00002	45.0	0.00	14.4	1.5:1	0.025	0.023	1.34	1.49	255400	II	M	PrS
L-6A-1	310+53	0.15	10	33	19.4	0.00073	4.0	0.07	3.0	1.5:1	0.045	0.025	1.28	2.30		II	M	E
	260+00	0.38	24	34	15.7	0.00073	4.0	0.07	3.0	1.5:1	0.045	0.025	1.28	2.30		II	M	E
	119+00	1.97	88	111	5.4	0.00073	A= 59.47		P= 23.51		0.040	0.040	1.86	1.86		IV	M	E
	117+00	1.97	88	111	5.4	0.00005	12.0	0.01	6.9	1.5:1	0.035	0.023	0.78	1.21		II	M	E
	0+00	3.76	151	154	4.8	0.00005	14.0	0.01	7.4	1.5:1	0.035	0.023	0.83	1.24	27700	II	M	S
L-6A-1B	150+00																	
	0+00	.40	Estimated												4200	II	M	E
L-6A-2	250+00																	
	0+00	1.44	Estimated												25200	II	M	E
L-6A-2A	40+00																	
	0+00	.50	Estimated												1400	II	M	E
L-6A-2B	55+00																	
	0+00	.50	Estimated												1900	II	M	E

1/ See Attached Coding System for Inventory of Channel Work
2/ Design capacity of Channel L-6A below Junction with Channel M-6 will carry the total flow at that point.

Channel	Station	Drainage Area	Capacity		Water Surf. Elev.	Hydr. Grad.	Bottom Width	Bottom Grade	Flow Depth	Side Slope	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	[illegible]	Inventory of Chan. Work [1] Type of Work	Type Chan. Before Proj.	Flow Cond. Before Proj.
		sq mi	cfs	cfs		ft/ft	ft	%	ft				fps	fps	cu yd			
6A-3	410+00	0.12	73[3]	83	17.9	0.00025	A= 103.00		P= 32.00		0.040	0.040	0.81	0.81		IV	M	E
	360+00	0.74	265[3]	461	17.2	0.00025	A= 233.00		P= 52.00		0.035	0.035	1.15	1.15		IV	M	E
	145+53	4.26	890[3]	1067	11.8	0.00025	24.0	0.01	9.1	1.5:1	0.025	0.023	3.11	3.46		II	M	E
	80+00	5.55	1035[3]	1067	10.4	0.00025	24.0	0.01	9.1	1.5:1	0.025	0.023	3.11	3.46		II	M	E
	0+00	6.12	1094[3]	1112	8.2	0.00025	24.0	0.01	9.3	1.5:1	0.025	0.023	3.15	3.50	167200	II	M	S
6A-3A	55+00	0.01	1	27	19.4	0.00051	4.0	0.05	3.0	1.5:1	0.045	0.025	1.07	1.93		II	M	E
	8+00	0.45	26	27	17.0	0.00051	4.0	0.05	3.0	1.5:1	0.045	0.025	1.07	1.93		II	M	E
	0+00	0.45	26	50	15.6	0.00175	4.0	0.18	3.0	1.5:1	0.045	0.025	1.98	3.56	1800	II	M	E
6A-3D	6+53	0.07	50[3]	1	18.0	0.00020	A= 81.00		P= 23.00		0.040	0.040	1.22	1.22		IV	M	E
	0+00	0.09	60[3]	59	17.9	0.00020	A= 59.00		P= 22.00		0.040	0.040	1.00	1.00		IV	M	E
6A-3E	5+36	0.07	50[3]	53	18.3	0.00019	6.0	0.07	4.4	1.5:1	0.040	0.025	0.95	1.52		II	M	E
	0+00	0.09	60[3]	60	18.2	0.00019	6.0	0.07	4.7	1.5:1	0.040	0.025	0.99	1.58	800	II	M	E
6A-3F	3+24	0.25	123[3]	127	18.6	0.00030	6.0	0.03	6.0	1.5:1	0.040	0.025	1.41	2.25		II	M	E
	0+00	0.25	123[3]	127	18.5	0.00030	6.0	0.03	6.0	1.5:1	0.040	0.025	1.41	2.25	300	II	M	E
6A-4	135+00															II	M	E
	50+00															II	M	E
	0+00	2.09	Estimated												9200	II	[illegible]	S
6A-5	65+21	0.26	16	33	18.4	0.00073	4.0	0.07	3.0	1.5:1	0.045	0.025	1.28	2.30		II	M	E
	93+00	0.41	24	33	16.4	0.00073	4.0	0.07	3.0	1.5:1	0.045	0.025	1.28	2.30	1000	II	M	E
	110+00	0.60	24	43	15.2	0.00073	A= 29.85		P= 16.12		0.042	0.042	1.46	1.46		IV	M	E
	120+36	0.72	38	48	14.4	0.00073	A= 41.46		P= 18.16		0.060	0.060	1.16	1.16		VI	M	E
	188+67	1.13	55	92	6.9	0.00110	A= 60.22		P= 23.71		0.060	0.060	1.53	1.53		VI	M	E
	235+97	3.37	138	152	5.5	0.00030	A= 143.91		P= 37.13		0.060	0.060	1.06	1.06		VI	M	S
6A-5A	80+00	1.13	55	63	10.3	0.00105	A= 37.57		P= 21.12		0.042	0.042	1.68	1.68		IV	M	E
	77+50	1.14	56	63	10.0	0.00105	A= 37.57		P= 21.12		0.042	0.042	1.68	1.68		IV	M	E
	15+00	1.70	78	99	7.5	0.00040	A= 64.98		P= 23.61		0.038	0.038	1.53	1.53		IV	M	E
	0+00	1.78	81	85	6.9	0.00040	A= 82.81		P= 27.77		0.060	0.060	1.03	1.03		VI	M	E
6A-6	107+58	0.46	26	36	9.7	0.00035	A= 33.71		P= 17.18		0.041	0.041	1.06	1.06		IV	M	E
	40+00	2.74	124	149	7.3	0.00035	A= 92.30		P= 29.45		0.037	0.037	1.62	1.62		IV	M	E
	0+00	4.12	163	263	5.9	0.00035	A= 141.86		P= 39.42		0.035	0.035	1.85	1.85		IV	M	S
6A-6A	190+00															II	M	E
	0+00	2.23	Estimated												10800	II	M	E
6A-6C	135+00															II	M	E
	0+00	.35	Estimated												3300	II	M	E
5A-6D	115+00															II	M	E
	0+00	.40	Estimated												3200	II	M	E
5A-7	173+00	1.88	88	188	17.0	0.00020	A= 204.10		P= 47.94		0.060	0.060	0.92	0.92		VI	M	E
	150+47	21.60	95	136	16.5	0.00020	A= 167.80		P= 47.63		0.060	0.060	0.81	0.81		VI	M	E
	79+50	4.77	184	417	10.7	0.00082	A= 22.01		P= 50.44		0.060	0.060	1.89	1.89		VI	M	E
	43+70	6.23	230	314	9.4	0.00035	A= 237.50		P= 49.31		0.060	0.060	1.32	1.32		VI	M	E
	0+00	9.59	329	431	7.9	0.00035	A= 209.70		P= 52.54		0.034	0.034	2.06	2.06		IV	M	E
A-7A	90+00	0.55	30	51	17.6	0.00178	4.0	0.17	3.0	1.5:1	0.045	0.025	2.00	3.60		II	M	E
	63+00	0.62	34	51	12.9	0.00178	4.0	0.17	3.0	1.5:1	0.045	0.025	2.00	3.60		II	M	E
	7+29	1.73	79	79	9.8	0.00055	8.0	0.07	4.0	1.5:1	0.040	0.025	1.42	2.27	9700	II	M	E
	0+00	2.77	117	186	9.4	0.00055	A= 139.00		P= 39.86		0.060	0.060	1.34	1.34		VI	M	E
A-7B	35+00															II	M	E
	0+00	.50	Estimated												1200	II	M	E
A-9	25+00															II	M	E
	0+00	.20	Estimated												400	II	M	E
3	210+00		Estimated													I	O	E
	139+63	0.96	48	50	5.3	0.00015	6.0	0.02	4.5	1.5:1	0.040	0.025	0.87	1.39		I	O	E
	124+25	1.01	50	52	5.1	0.00015	6.0	0.02	4.6	1.5:1	0.040	0.025	0.88	1.41		I	O	E
	110+51	2.24	98	101	4.9	0.00015	10.0	0.07	5.4	1.5:1	0.040	0.025	1.03	1.65		II	M	E
	71+00	2.63	112	112	4.6	0.00006	14.0	0.03	6.3	1.5:1	0.035	0.023	0.76	1.18		II	M	S
	44+00	2.67	113	116	4.5	0.00006	14.0	0.01	6.4	1.5:1	0.035	0.023	0.77	1.20		II	M	E
	0+50	2.95	123	125	4.3	0.00006	14.0	0.01	6.5	1.5:1	0.035	0.023	0.81	1.26	42100	II	M	S
-1	30+00															II	M	E
	0+00	.[illegible]5	Estimated												2000	II	M	E
	342+00	1.84	Estimated													II	M	E
	222+16	2.68	114	117	9.6	0.00174	6.0	0.18	4.0	1.5:1	0.045	0.025	2.44	4.39		II	M	E
	200+00	2.69	114	117	5.7	0.00174	6.0	0.18	4.0	1.5:1	0.045	0.025	2.44	4.39		II	M	E
	144+00	3.10	128	129	5.2	0.00010	12.0	0.01	6.5	1.5:1	0.040	0.025	0.91	1.46		II	M	E
	113+00	[illegible].15	130	152	4.9	0.00010	12.0	0.01	6.6	1.5:1	0.035	0.023	1.05	1.63		II	M	S
	105+46	5.27	224	226	4.8	0.00010	16.0	0.11	7.3	1.5:1	0.035	0.023	1.15	1.79		II	M	IS
	0+00	9.40	324	385	45.0	0.00003	22.0	0.003	10.0	1.5:1	0.025	0.023	1.04	1.16	102700	II	M	IS
-1	170+00															II	M	E
	0+00	4.08	Estimated												20700	II	M	E
-2	50+00															II	M	E
	0+00	.70	Estimated												2500	II	M	E

1/ See Attached Coding System for Inventory of Channel Work
3/ 100-year peak flow; elevations and slope of hydraulic gradient established for urban protection

(Continued)
[illegible] Data Channels
[illegible] Watershed, Louisiana

Channel	Station	Drainage Area (sq mi)	Capacity Req'd (cfs)	Capacity Des. (cfs)	Water Surf. Elev.	Hydr. Grad. (ft/ft)	Channel Dimensions: Bottom Width (ft)	Bottom Grade (%)	Flow Depth (ft)	Side Slope	"n" Value Aged	"n" Value As Built	Velocity Aged (fps)	Velocity As Built (fps)	Excavation (cu yd)	Inventory of Chan. Work 1/ Type of Work	Type Chan. Before Proj.	Flow Cond. Before Proj.
L-6D	264+40	.98	Estimated													II	M	E
	188+80	1.59	74	76	5.5	0.00005	12.0	0.01	5.9	1.5:1	0.040	0.025	0.62	0.99		II	M	E
	0+00	5.95	221	241	4.6	0.00005	20.0	0.01	7.6	1.5:1	0.030	0.023	1.01	1.35	42900	II	M	S
L-7A	199+60	3.03	129	313	4.5	0.00002	A= 443.00		P= 78.00		0.030	0.030	0.71	0.71		VI	M	S
	176+25	3.44	140	313	4.5	0.00002	A= 443.00		P= 78.00		0.030	0.030	0.71	0.71		VI	M	S
L-7A-1	273+00	1.46	69	71	4.7	0.00001	18.0	0.02	6.8	1.5:1	0.035	0.023	0.37	0.58		II	M	S
	219+00	2.70	114	116	4.6	0.00001	20.0	0.02	7.8	1.5:1	0.030	0.023	0.47	0.63	29600	II	M	S
L-7A-1B	40+00															II	M	S
	0+00	.38	Estimated												1100	II	M	S
L-7A-1C	45+00															II	M	S
	0+00	.40	Estimated												1300	II	M	S
L-7A-1D	45+00															II	M	E
	0+00	.15	Estimated												500	II	M	E
L-7A-2	237+39	2.29	100	196	5.6	0.00033	A= 173.00		P= 43.90		0.060	0.060	1.13	1.13		VI	M	S
	230+00	2.31	101	196	5.4	0.00033	A= 173.00		P= 43.90		0.060	0.060	1.13	1.13		VI	M	S
	155+00	2.84	120	173	5.1	0.00004	A= 240.00		P= 51.30		0.032	0.032	0.82	0.82		IV	M	S
	90+30	4.22	166	315	4.8	0.00004	A= 370.00		P= 65.20		0.035	0.035	0.85	0.85		VI	M	S
L-7A-2A	161+55	3.93	167	173	10.3	0.00058	A= 120.00		P= 31.40		0.060	0.060	1.45	1.45		VI	M	S
	85+00	4.81	185	310	6.1	0.00058	A= 192.00		P= 42.70		0.060	0.060	1.62	1.62		VI	M	S
	0+00	5.44	205	377	4.8	0.00015	A= 322.00		P= 56.90		0.050	0.050	1.17	1.17		VI	M	S
L-7A-2A-2	30+85	2.07	92	93	10.6	0.00010	10.0	0.02	5.8	1.5:1	0.040	0.025	0.86	1.38		II	M	S
	0+00	2.23	97	100	10.3	0.00010	10.0	0.02	6.0	1.5:1	0.040	0.025	0.87	1.39	1000	II	M	S
L-7A-2B	148+00															II	M	E
	70+00															II	M	E
	0+00	.60	Estimated												6200	II	M	S
L-7A-2C	50+00															II	M	S
	0+00	.20	Estimated												700	II	M	S
L-7A-2D	30+00															II	M	S
	0+00	.07	Estimated												200	II	M	S
L-7A-2E	30+00															II	M	S
	0+00	.11	Estimated												200	II	M	S
L-7A-3	6+85	0.60	37	44	4.5	0.00005	A= 107.00		P= 30.60		0.060	0.060	0.41	0.41		VI	M	S
	0+00	0.61	33	58	4.5	0.00005	A= 142.00		P= 40.00		0.060	0.060	0.41	0.41		VI	M	S
L-7A-3A	54+00	0.13	9	9	4.8	0.00005	4.0	0.08	3.0	1.5:1	0.045	0.025	0.34	0.61		II	M	E
	36+70	0.30	18	18	4.7	0.00005	4.0	0.08	4.3	1.5:1	0.045	0.025	0.41	0.74	900	II	M	E
	15+00	0.35	21	32	4.6	0.00005	A= 63.30		P= 24.60		0.039	0.039	0.50	0.50		IV	M	S
	0+00	0.37	22	47	4.5	0.00005	A= 114.00		P= 31.10		0.060	0.060	0.41	0.41		VI	M	S
L-7B South	0+00	9.26	320	375	4.8	0.00001	A= 695.00		P= 117.00		0.030	0.030	0.54	0.54		IV	M	PrS
	17+00	9.26	320	315	4.8	0.00001	A= 446.00		P= 65.70		0.025	0.025	0.71	0.71		IV	M	PrS
	100+00	14.66	469	494	4.7	0.00001	50.0	0.00	10.0	1.5:1	0.025	0.023	0.76	0.84	78200	II	M	PrS
L-7B North	160+00	4.22	166	170	5.6	0.00005	14.0	0.02	7.8	1.5:1	0.035	0.023	0.85	1.32		II	M	S
	110+00	6.75	246	259	5.4	0.00005	14.0	0.02	8.7	1.5:1	0.030	0.023	0.80	1.07	11700	II	M	S
	60+00	9.09	315	418	5.1	0.00005	A= 367.00		P= 62.70		0.030	0.030	1.14	1.14		IV	M	IS
	0+00	9.26	320	343	4.8	0.00005	A= 383.00		P= 60.90		0.040	0.040	0.90	0.90		VI	M	IS
L-7B-1	163+85	3.28	135	257	7.3	0.00090	A= 141.00		P= 36.60		0.060	0.060	1.82	1.82		VI	M	S
	188+00	3.60	145	336	5.1	0.00090	A= 164.00		P= 36.10		0.060	0.060	2.03	2.03		VI	M	S
	259+00	4.87	187	295	4.8	0.00005	A= 287.00		P= 57.10		0.030	0.030	1.02	1.02		IV	M	S
L-7B-1A	35+00															II	M	E
	0+00	.20	Estimated												500	II	M	E
L-7B-1B	70+00															II	M	E
	0+00	.30	Estimated												1500	II	M	E
L-7B-2	143+76	2.16	95	119	5.9	0.00030	A= 91.70		P= 31.70		0.040	0.040	1.30	1.30		VI	M	S
	164+20	2.20	96	287	5.3	0.00030	A= 163.00		P= 35.90		0.040	0.040	1.76	1.76		VI	M	S
L-7B-2A	39+03	0.01	1	34	8.5	0.00080	4.0	0.09	3.0	1.5:1	0.045	0.025	1.34	2.41		II	M	E
	0+00	0.65	35	37	5.0	0.00080	4.0	0.09	3.1	1.5:1	0.045	0.025	1.37	2.46	4000	II	M	E
L-7B-3	23+40	1.42	67	86	6.3	0.00040	A= 91.40		P= 27.70		0.070	0.070	0.94	0.94		VI	M	E
	0+00	1.48	69	79	5.4	0.00040	A= 87.10		P= 27.70		0.070	0.070	0.92	0.92		VI	M	E
L-7B-3A	70+00															II	M	E
	0+00	.18	Estimated												900	II	M	E
L-7B-4	78+18	0.17	11	23	6.5	0.00025	A= 30.30		P= 16.70		0.045	0.045	0.74	0.74		IV	M	E
	55+90	0.32	19	28	5.9	0.00025	A= 37.40		P= 22.00		0.045	0.045	0.74	0.74		IV	M	E
	8+00	0.70	37	38	5.6	0.00007	8.0	0.01	4.4	1.5:1	0.040	0.025	0.60	0.96	3500	II	M	E
	0+00	0.85	44	43	5.5	0.00007	A= 71.60		P= 27.10		0.040	0.040	0.57	0.57		IV	M	S

1/ See Attached Coding System for Inventory of Channel Work

Channel	Station	Drainage Area	Capacity Req'd	Capacity Des.	Water Surf. Elev.	Hydr. Grad.	Channel Dimensions Bottom Width	Bottom Grade	Flow Depth	Side Slope	"n" Value Aged	"n" Value As Built	Velocity Aged	Velocity As Built	Excavation	Inventory of Chan. Work 1/ Type of Work	Type Chan. Before Proj.	Flow Cond. Before Proj.
		sq mi	cfs	cfs		ft/ft	ft	%	ft				fps	fps	cu yd			
L-7B-4A	18+82	0.10	7	7	7.5	0.00085	A= 9.41		P= 13.20		0.045	0.045	0.74	0.74		IV	M	E
	9+00	0.12	9	19	6.6	0.00085	A= 16.50		P= 12.60		0.045	0.045	1.15	1.15		IV	M	I
	0+00	0.28	17	60	5.9	0.00085	A= 41.00		P= 22.00		0.045	0.045	1.35	1.35		VI	M	E
L-7C	170+00	7.52	269	274	5.5	0.00004	14.0	0.01	9.5	1.5:1	0.030	0.023	1.02	1.36		II	M	IS
	100+00	7.82	278	281	5.2	0.00004	14.0	0.01	9.6	1.5:1	0.030	0.023	1.03	1.37		II	M	IS
L-7C-1	320+00	0.08	6	18	16.6	0.00080	A= 17.00		P= 14.00		0.045	0.045	1.05	1.05		IV	M	E
	300+00	0.23	15	18	15.0	0.00080	A= 17.00		P= 14.00		0.045	0.045	1.05	1.05		IV	M	E
	237+00	0.81	42	110	9.9	0.00080	A= 93.00		P= 30.00		0.075	0.075	1.98	1.98		VI	M	E
	230+00	1.19	58	145	9.3	0.00080	A= 108.00		P= 29.00		0.075	0.075	1.34	1.34		VI	M	S
	121+00	2.98	124	181	6.0	0.00030	A= 211.00		P= 53.00		0.075	0.075	1.44	1.44		VI	M	S
	95+30	3.25	134	166	5.9	0.00004	A= 219.00		P= 49.10		0.035	0.035	0.75	0.75		IV	M	S
	0+00	7.52	269	274	5.5	0.00004	14.0	0.01	9.5	1.5:1	0.030	0.023	1.02	1.36	14400	II	M	IS
L-7C-1A	60+00	0.84	43	62	6.3	0.00010	A= 81.30		P= 27.30		0.040	0.040	0.77	0.77		IV	M	E
	44+00	0.87	45	62	6.1	0.00010	A= 81.30		P= 27.30		0.040	0.040	0.77	0.77		IV	M	E
	30+00	1.16	57	59	6.0	0.00010	6.0	0.01	5.4	1.5:1	0.040	0.025	0.77	1.23		II	M	E
	0+00	1.61	74	76	5.7	0.00010	6.0	0.03	6.1	1.5:1	0.040	0.025	0.82	1.31	700	II	M	S
L-7C-1B	50+00															II	M	E
	0+00	1.10	Estimated												3900	II	M	E
L-7D	1093+00	.65	Estimated													II	M	E
	777+90	1.71	Estimated		18.6											II	M	E
	734+30	2.74	116	119	11.5	0.00158	A= 132.00		P= 33.70		0.050	0.050	2.91	2.91		VI	M	E
	557+00	6.49	238	239	8.8	0.00015	8.0	0.02	8.3	1.5:1	0.035	0.023	1.41	2.19		II	M	IS
	550+00	7.74	275	316	8.7	0.00010	12.0	0.01	8.7	1.5:1	0.030	0.023	1.45	1.93		II	M	IS
	475+80	13.50	437	440	8.0	0.00010	12.0	0.03	10.2	1.5:1	0.030	0.023	1.58	2.11	46000	II	M	IS
	433+50	16.11	6	601	7.6	0.00010	A= 370.00		P= 62.00		0.030	0.030	1.62	1.62		IV	M	PrS
	200+00	25.10	733	915	5.6	0.00008	A= 533.00		P= 71.40		0.030	0.030	1.72	1.72		VI	M	PrS
	110+00	25.30	739	761	5.2	0.00005	A= 569.00		P= 76.00		0.030	0.030	1.34	1.34		VI	M	PrS
	80+00	31.82	849	1086	5.0	0.00007	A= 778.00		P= 122.00		0.030	0.030	1.39	1.39		VI	M	PrS
L-7D-1	305+50	0.82	43	43	5.8	0.00003	8.0	0.02	5.8	1.5:1	0.040	0.025	0.44	0.70		II	M	S
	94+75	5.98	222	246	5.3	0.00003	18.0	0.01	9.2	1.5:1	0.030	0.023	0.84	1.12	23600	II	M	S
	0+00	6.39	235	235	5.0	0.00003	A= 308.00		P= 61.50		0.030	0.030	0.76	0.76		IV	M	S
L-7D-1A	60+00															II	M	E
	40+00															II	M	E
	0+00	.32	Estimated												1400	II	M	S
L-7D-1B	70+00															II	M	E
	40+00															II	M	E
	0+00	.35	Estimated												1700	II	M	S
L-7D-1C	234+00	0.89	45	46	7.7	0.00010	6.0	0.02	4.8	1.5:1	0.040	0.025	0.72	1.15		II	M	E
	195+00	1.12	55	55	7.4	0.00010	6.0	0.02	5.2	1.5:1	0.040	0.025	0.76	1.22	1500	II	M	E
	150+00	2.02	90	173	6.9	0.00010	A= 229.00		P= 56.50		0.050	0.050	0.76	0.76		VI	M	E
	0+00	2.21	97	121	5.4	0.00010	A= 138.00		P= 37.60		0.040	0.040	0.88	0.88		VI	M	S
L-7D-1C-1	65+00															II	M	E
	0+00	.70	Estimated												3200	II	M	E
L-7D-1E	73+50															II	M	E
	55+00															II	M	E
	0+00	.50	Estimated												2600	II	M	S
L-7D-1G	57+00															II	M	E
	15+00															II	M	E
	0+00	.40	Estimated												1600	II	M	S
L-7D-1H	50+00															II	M	E
	0+00	.40	Estimated												1400	II	M	E
L-7D-3	41+00	3.36	154	300	8.1	0.00023	A= 278.00		P= 56.90		0.060	0.060	1.08	1.08		VI	M	S
	0+00	3.50	142	321	7.2	0.00023	A= 282.00		P= 53.20		0.060	0.060	1.14	1.14		VI	M	S
L-7D-3A	195+22	0.06	21 4/	22	21.0	0.00020	4.0	0.07	3.7	1.5:1	0.045	0.025	0.71	1.28		II	M	E
	183+10	0.13	31 4/	32	20.8	0.00020	4.0	0.07	4.3	1.5:1	0.045	0.025	0.82	1.48		II	M	E
	94+00	0.60	110 4/	114	19.0	0.00020	6.0	0.05	7.0	1.5:1	0.040	0.025	1.18	1.89	7000	II	M	E
	79+78	0.69	37	219	14.6	0.00045	A= 157.00		P= 36.30		0.060	0.060	1.39	1.39		VI	M	E
	44+00	1.57	73	754	11.7	0.00081	A= 290.00		P= 53.80		0.050	0.050	2.59	2.59		VI	M	E
	0+00	3.50	142	686	8.1	0.00081	A= 267.00		P= 50.50		0.050	0.050	2.58	2.58		VI	M	S
L-7D-3A-1	93+00															II	M	E
	0+00	.25	Estimated												1600	II	M	E
L-7D-4	67+00															II	M	E
	0+00	.25	Estimated												1200	II	M	E
L-7D-6	140+00															II	M	E
	0+00	.65	Estimated												6400	II	M	E
L-7D-7	101+25	1.68	77	77	10.9	0.00031	A= 61.70		P= 23.60		0.040	0.040	1.23	1.23		IV	M	E
	0+00	3.63	146	147	8.3	0.00013	A= 140.00		P= 36.00		0.040	0.040	1.62	1.62		IV	M	E
L-7D-8	130+00															II	M	E
	0+00	.45	Estimated												4100	II	M	E

1/ See Attached Coding System for Inventory of Channel Work
4/ 2-year peak flow

(continued)
Table 3 - Structure Data - Channels
Lake Verret Watershed, Louisiana

Channel	Station	Drainage Area	Capacity Req'd	Capacity Des.	Water Surf. Elev.	Hydr. Grad.	Channel Dimensions: Bottom Width	Bottom Grade	Flow Depth	Side Slope	"n" Value Aged	"n" Value As Built	Velocities Aged	Velocities As Built	Excavation	Inventory of Chan. Work 1/ Type of Work	Type Chan. Before Proj.	Flow Cond. Before Proj.
		sq mi	cfs	cfs		ft/ft	ft	%	ft				fps	fps	cu yd			
L-7D-10	102+00															II	M	E
	0+00	.45	Estimated												3200	II	M	E
L-7D-10A	62+00															II	M	E
	0+00	.40	Estimated												1700	II	M	E
L-7D-10A-1	27+00															II	M	E
	0+00	.25	Estimated												500	II	M	E
L-7D-13	73+00															II	M	E
	0+00	.35	Estimated												1800	II	M	E
L-7D-14	784+00	0.95	54	86	19.4	0.00159	A= 50.30		P= 22.00		0.060	0.060	1.71	1.71		VI	M	E
	777+90	10.00	50	86	18.4	0.00159	A= 50.30		P= 22.00		0.060	0.060	1.71	1.71		VI	M	E
L-7D-14A	66+00															II	M	E
	0+00	.26	Estimated												1200	II	M	E
M-8	106+54	0.57	32	57	15.0	0.00018	A= 80.50		P= 28.00		0.060	0.060	0.67	0.67		VI	M	E
	140+00	1.30	65	70	14.4	0.00018	A= 86.50		P= 27.00		0.060	0.060	0.81	0.81		VI	M	E
	150+00	1.44	69	292	14.2	0.00022	A= 265.00		P= 53.00		0.060	0.060	1.10	1.10		VI	M	E
L-8A	72+38	0.08	27 5/	28	18.6	0.00010	7.0	0.05	3.8	1.5:1	0.045	0.025	0.58	1.04		II	M	E
	40+00	26.00	59 5/	70	18.3	0.00010	9.0	0.05	5.2	1.5:1	0.040	0.025	0.80	1.28	1200	II	M	E
	0+50	0.46	90 5/	117	17.9	0.00010	A= 150.00		P= 35.00		0.050	0.050	0.78	0.78		VI	M	E
L-8B	27+00	0.28	63 5/	66	19.8	0.00005	A= 108.00		P= 30.90		0.040	0.040	0.61	0.61		IV	M	E
	88+82	0.67	116 5/	117	19.5	0.00005	A= 150.00		P= 36.00		0.035	0.035	0.78	0.78		IV	M	E
	106+54	0.71	22 6/	76	15.0	0.00047	A= 70.50		P= 24.50		0.060	0.060	1.08	1.08		VI	M	E
M-9	12+00	0.43	85 5/	491	19.5	0.00050	A= 336.00		P= 56.00		0.075	0.075	1.46	1.46		VI	M	E
	0+00	0.48	92 5/	336	18.9	0.00050	A= 361.00		P= 58.00		0.120	0.120	0.93	0.93		VI	M	E
L-9A	20+00															II	M	E
	0+00	.10	Estimated												200	II	M	E

1/ See Attached Coding System for Inventory of Channel Work
5/ 2-year peak flow.
6/ Distributary channel at sta 88+82 diverts approximately one-half the flow

Coding System for Inventory of Channel Work

Type of Work	I -	establishment of new channel including necessary stabilization measures
	II -	enlargement or realignment of existing channel or stream
	III -	cleaning out natural or manmade channel (includes bar removal and major clearing and snagging operation)
	IV -	clearing and removal of loose debris within channel section
	V -	stabilization, by continuous treatment or localized problem areas, as primary purpose (present capacity adequate)
	VI -	present capacity adequate, no work proposed
Type of Channel Before Project	M -	manmade ditch or previously modified channel
	N -	an unmodified, well-defined natural channel or stream
	O -	no or practically no defined channel
Flow Condition Before Channel	Pr -	perennial: flow at all times except during extreme drought
	I -	intermittent: continuous flow during some seasons of the year but little or no flow during other seasons
	E -	ephemeral: flow only during periods of surface runoff
	S -	ponded water: no noticeable flow, caused by lack of outlet, high ground water table or elevation of the channel bottom in relation to mean sea level

TABLE 4 - ANNUAL COST

Lake Verret Watershed, Louisiana

(Dollars)1/

Evaluation Unit	Amortization of Installation Cost 2/	Operation and Maintenance Cost	Total
I	4,800	4,500	9,300
II	9,800	4,400	14,200
III	2,600	1,100	3,700
IV	3,100	3,000	6,100
V	11,700	5,500	17,200
VI	30,300	26,800	57,100
VII	42,000	46,000	88,000
VIII	10,900	12,100	23,000
IX	14,900	11,800	26,700
X	48,300	42,300	90,600
Urban	22,200	7,900	30,100
XI	2,500	2,900	5,400
Project Administration	30,600	xxxx	30,600
GRAND TOTAL	233,700	168,300	402,000

1/ Price base 1976 prices.

2/ Fifty years at 5.5 percent interest.

TABLE 5 - ESTIMATED AVERAGE ANNUAL FLOOD DAMAGE REDUCTION BENEFITS

Lake Verret Watershed, Louisiana

(Dollars)

Item	Estimated Average Annual Damage		Damage Reduction Benefit
	Without Project	With Project	
Floodwater			
Agricultural Crop and Pasture 1/	775,000	192,200	582,800
Nonagricultural Urban 2/	40,800	800	40,000
Indirect	81,600	19,300	62,300
TOTAL	897,400	212,300	685,100

1/ Current normalized prices, 1976.

2/ Price base 1976 prices.

TABLE 6 - COMPARISON OF BENEFITS AND COSTS

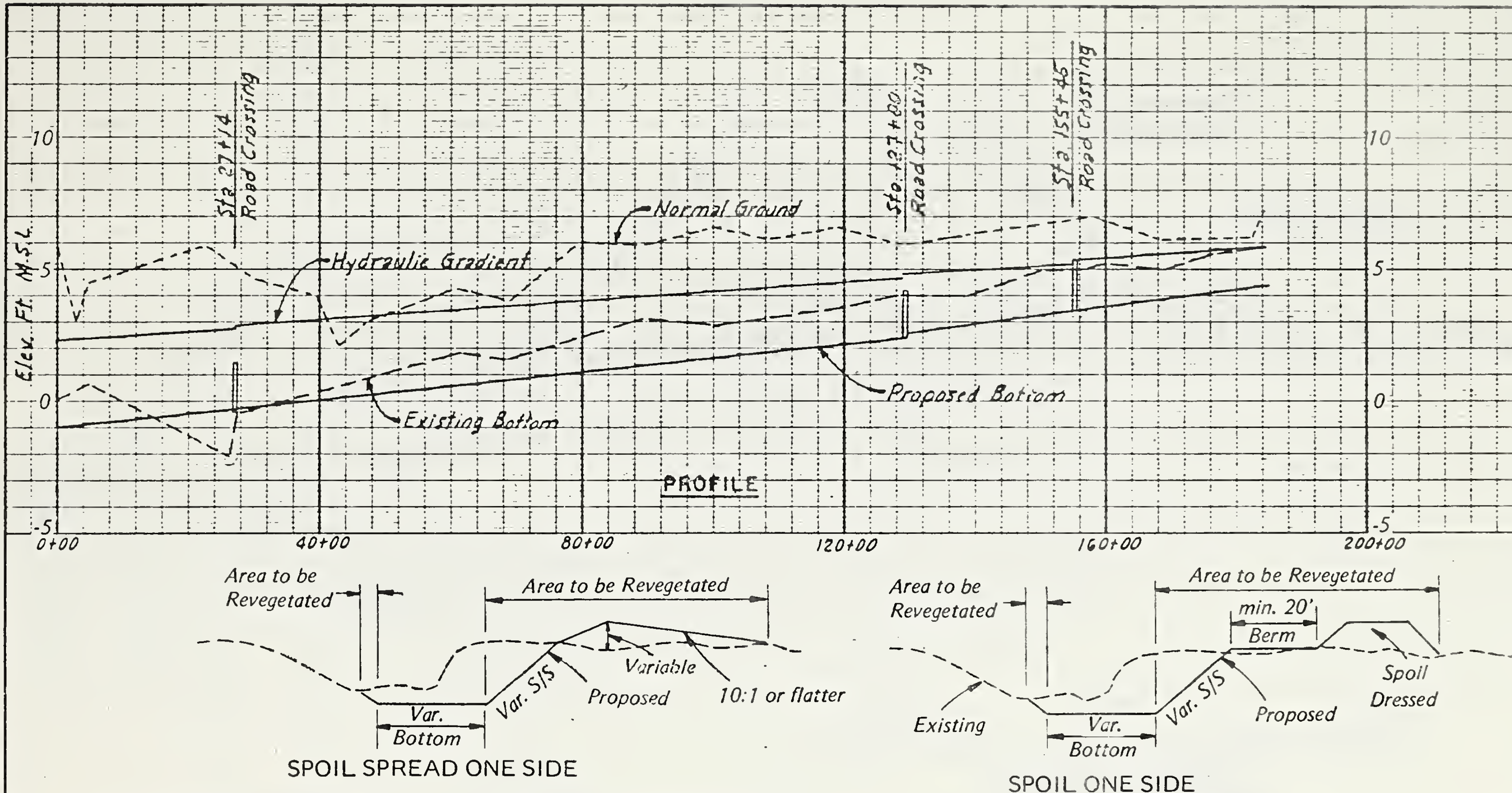
Lake Verret Watershed, Louisiana

(Dollars)

Evaluation Unit	Average Annual Benefits							
	Damage Reduction1/	More Intensive Land Use1/	Drainage1/	Redevelopment2/	Secondary1/	Total	Average Annual Cost3/	Benefit Cost Ratio
I	51,600	10,400	46,900	1,100	11,500	121,500	9,300	13.1:1
II	71,500	14,500	65,000	1,900	16,200	169,100	14,200	11.9:1
III	13,200	2,600	12,000	500	3,300	31,600	3,700	8.5:1
IV	30,900	6,200	28,100	600	6,500	72,300	6,100	11.9:1
V	78,600	15,900	71,500	1,900	18,900	186,800	17,200	10.9:1
VI	87,200	17,600	79,300	5,200	21,100	210,400	57,100	3.7:1
VII	132,800	26,800	120,700	9,300	37,700	327,300	88,000	3.7:1
VIII	41,800	8,400	38,000	2,400	8,400	99,000	23,000	4.3:1
IX	48,000	9,700	43,600	3,100	10,100	114,500	26,700	4.3:1
X	81,400	16,400	74,000	10,300	18,800	200,900	90,600	2.2:1
Urban 2/	44,000	-	-	2,900	4,100	51,000	30,100	1.7:1
XI	4,100	900	3,700	600	600	9,900	5,400	1.8:1
Project Administration	xxx	xxx	xxx	xxx	xxx	xxx	30,600	xxx
GRAND TOTAL	685,100	129,400	582,800	39,800	157,200	1,594,300	402,000	4.0:1

1/ Price base: Current normalized prices, 1976; except urban 2/.
2/ Price base: 1976 prices.
3/ Price base: Installation cost - 1976 prices amortized for 50 years at 5.5 percent; operation and maintenance cost-1976 prices.

January 1978



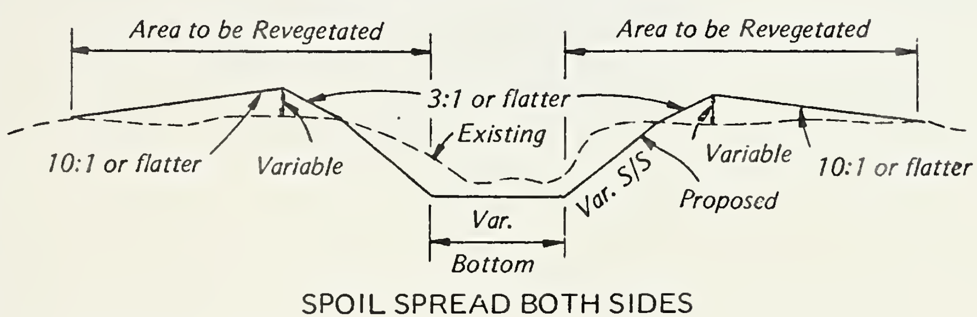


FIGURE 1

AREA TO BE REVEGETATED
CHANNEL PROFILE AND CROSS SECTIONS

LAKE VERRET WATERSHED
ASCENSION, ASSUMPTION, AND
IBERVILLE PARISHES, LOUISIANA

JULY 1976

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ALEXANDRIA, LOUISIANA

Rev. 6-76 4-35061

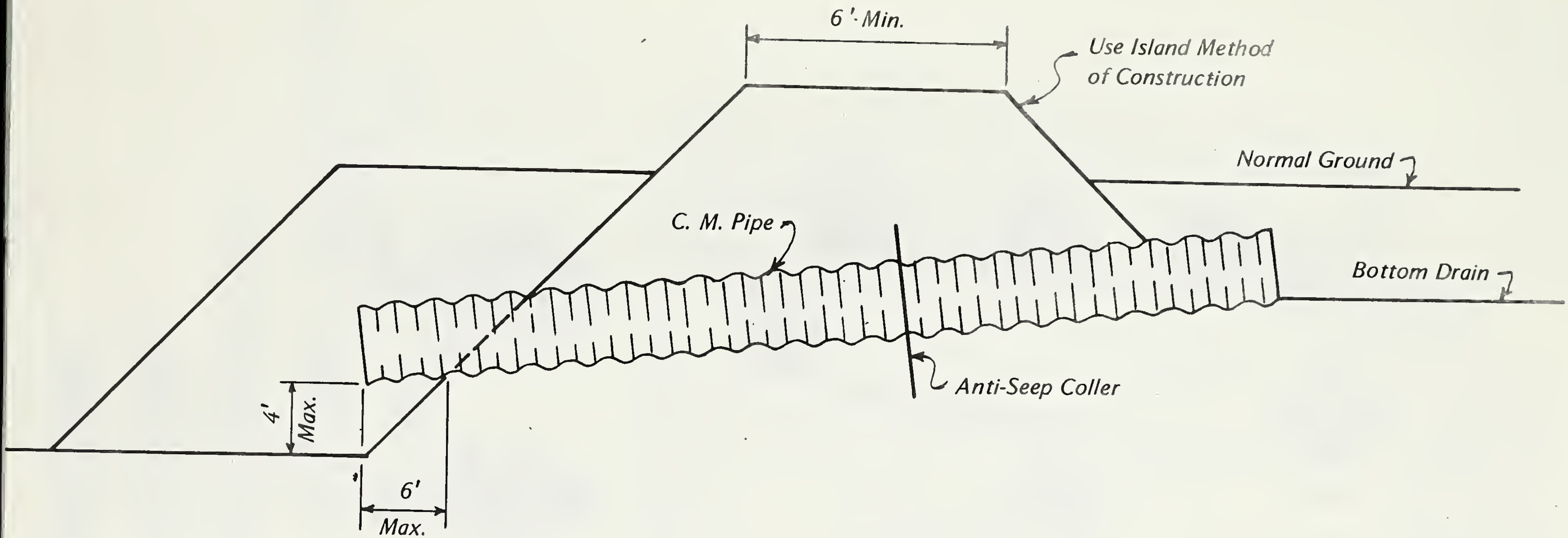


FIGURE 2

TYPICAL STRUCTURE FOR WATER CONTROL (PIPE DROP)

LAKE VERRET WATERSHED
ASCENSION, ASSUMPTION, AND
IBERVILLE PARISHES, LOUISIANA

JULY 1976

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ALEXANDRIA, LOUISIANA

Rev. 6-76 4-35062

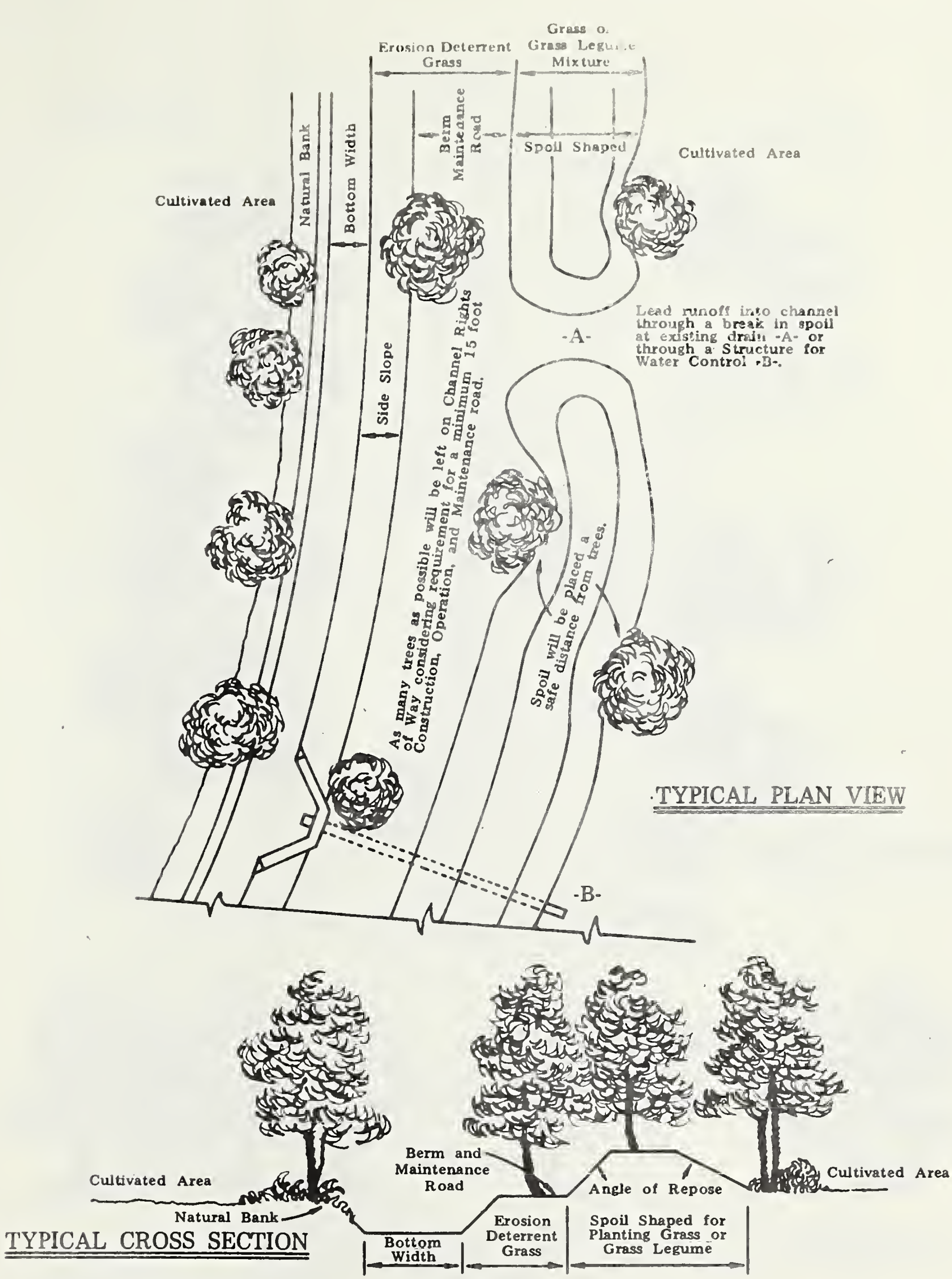


FIGURE 3

TYPICAL PLAN VIEW AND CROSS SECTION OF CHANNELS WHERE WOODY VEGETATION EXISTS ADJACENT TO CULTIVATED AREA

LAKE VERRET WATERSHED
ASCENSION, ASSUMPTION, AND
IBERVILLE PARISHES, LOUISIANA

JULY 1976

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ALEXANDRIA, LOUISIANA

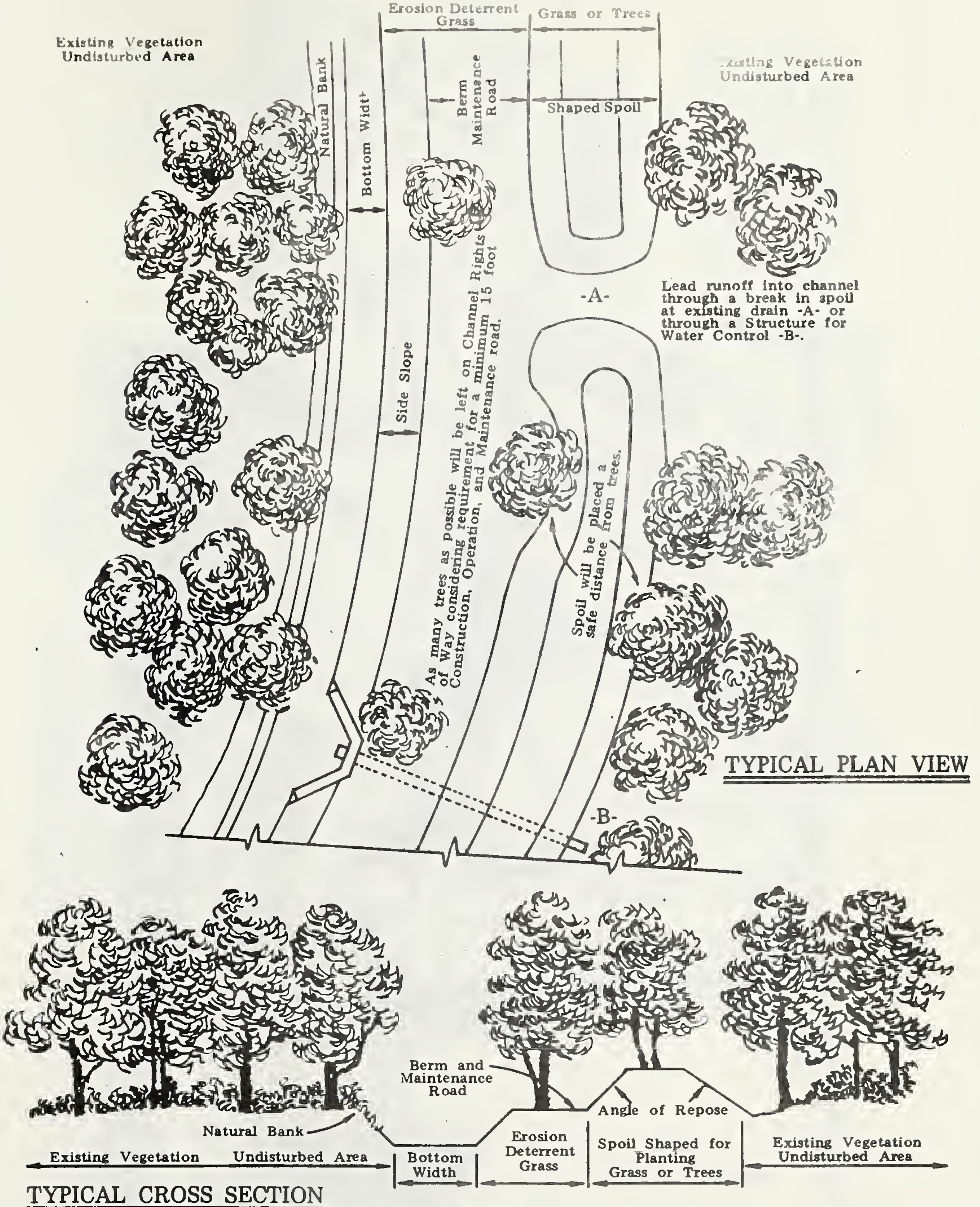


FIGURE 4

TYPICAL PLAN VIEW AND CROSS SECTION OF CHANNELS THROUGH FOREST LAND

LAKE VERRET WATERSHED
ASCENSION, ASSUMPTION, AND
IBERVILLE PARISHES, LOUISIANA

JULY 1976

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
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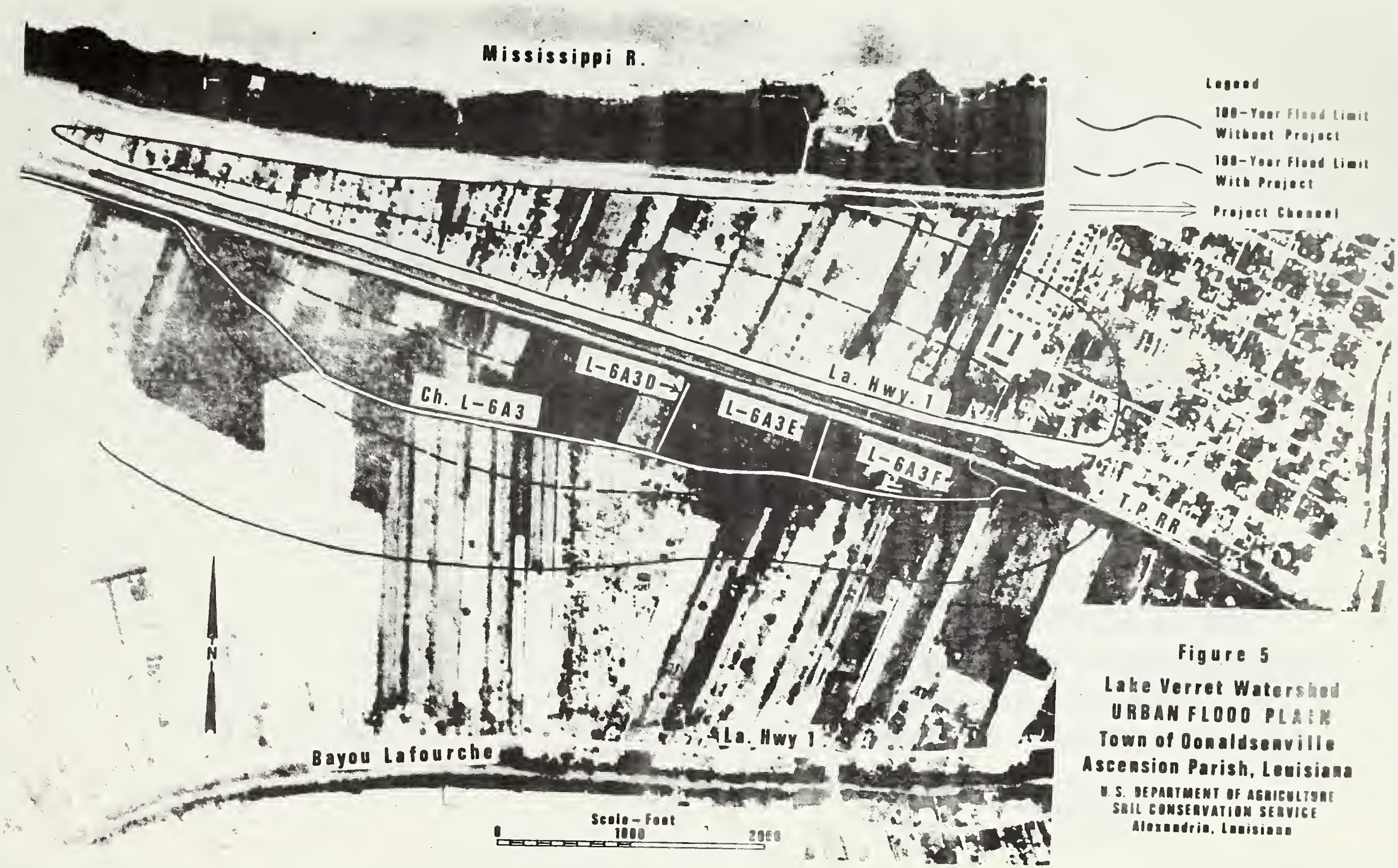

Figure 5

Lake Verret Watershed
URBAN FLOOD PLAIN
Town of Donaldsonville
Ascension Parish, Louisiana

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Alexandria, Louisiana

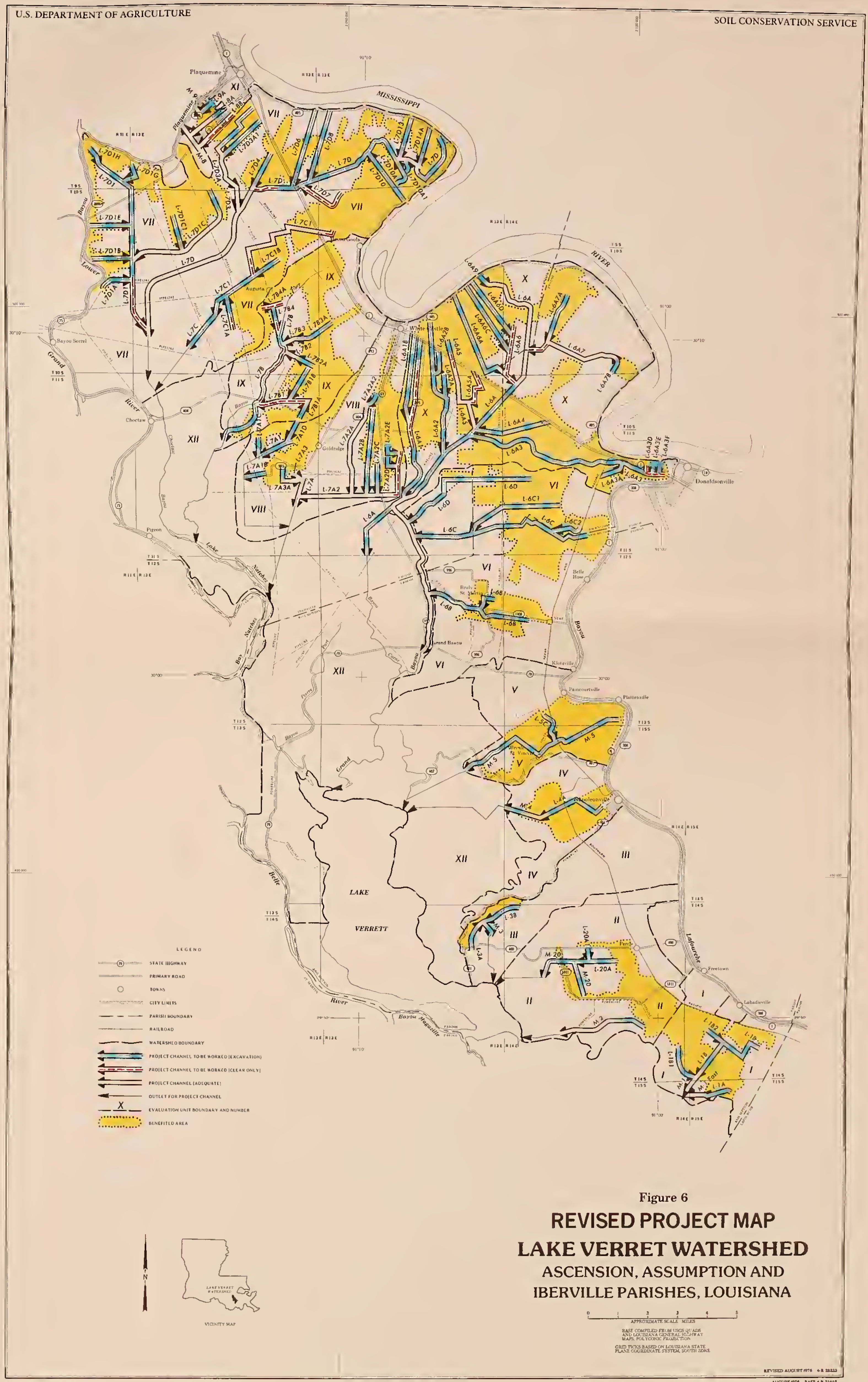

Figure 6

REVISED PROJECT MAP
LAKE VERRET WATERSHED
ASCENSION, ASSUMPTION AND IBERVILLE PARISHES, LOUISIANA

USDA-SCS-FORT WORTH, TEXAS 1976

environmental
impact
statement

LAKE VERRET WATERSHED

ASCENSION, ASSUMPTION, AND IBERVILLE PARISHES
LOUISIANA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ALEXANDRIA, LOUISIANA